MANITOU NORTH AMERICA, INC.
6401 Imperial Drive
Waco, TX 76712-6803

For Parts Orders contact your Manitou North America Dealer or call:
Manitou North America Parts Dept. (800) 425-3727 or (254) 799-0232.
Parts Dept. Fax (254) 867-6504 Website: www.manitou-na.com

K-D HAWK
M30-2/4 H

HYDROSTATIC & 4-SPEED TRANSMISSIONS
- TIER II ENGINE -

OPERATOR/SERVICE MANUAL

S/N: 751211, 752093 & above

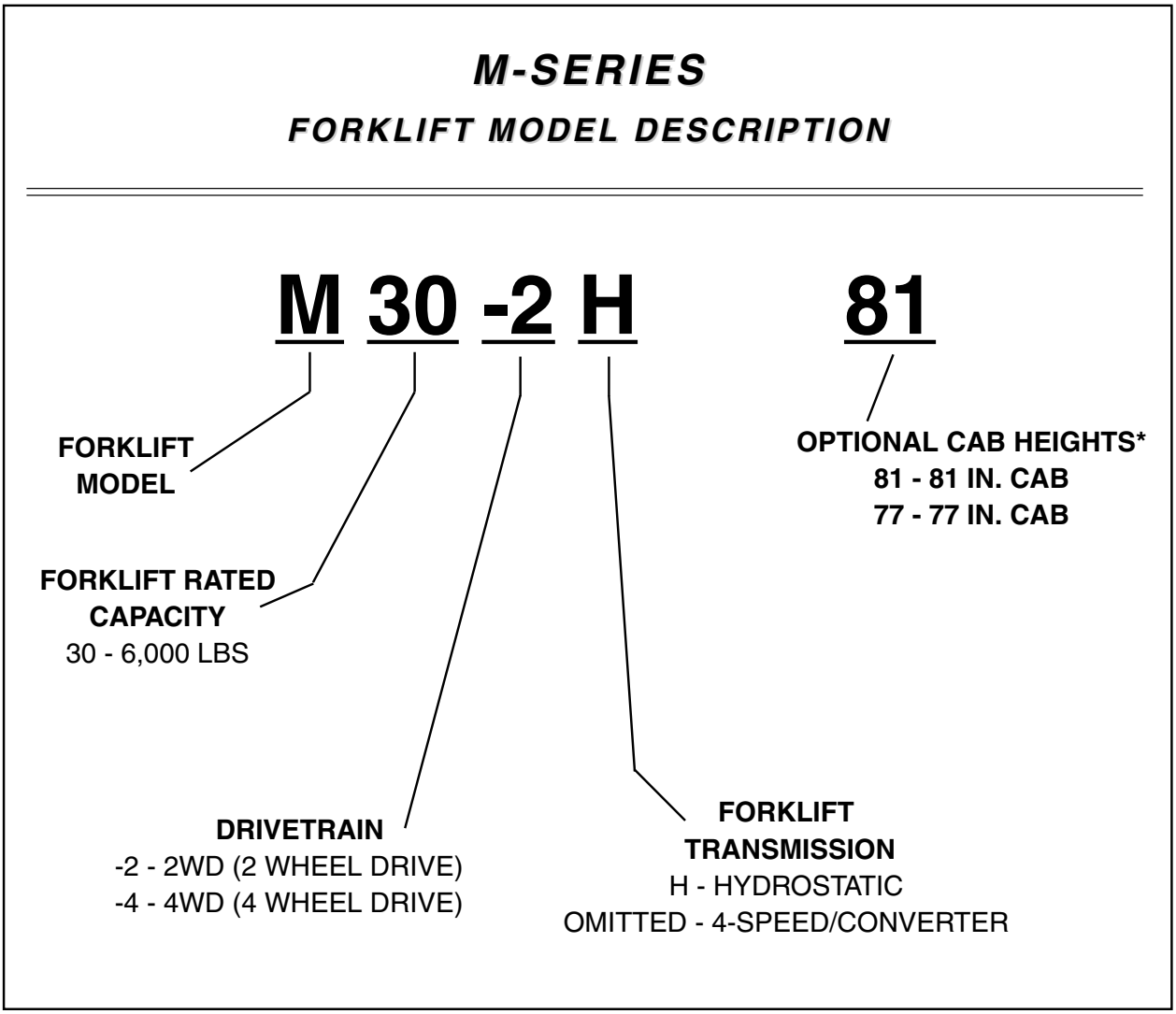
THIS OPERATOR'S MANUAL MUST BE KEPT IN THE LIFT TRUCK AND MUST BE READ AND UNDERSTOOD BY OPERATORS.

CATALOG 806328
R11-10

INTRODUCTION TO SAFETY

M-SERIES

FORKLIFT MODEL DESCRIPTION

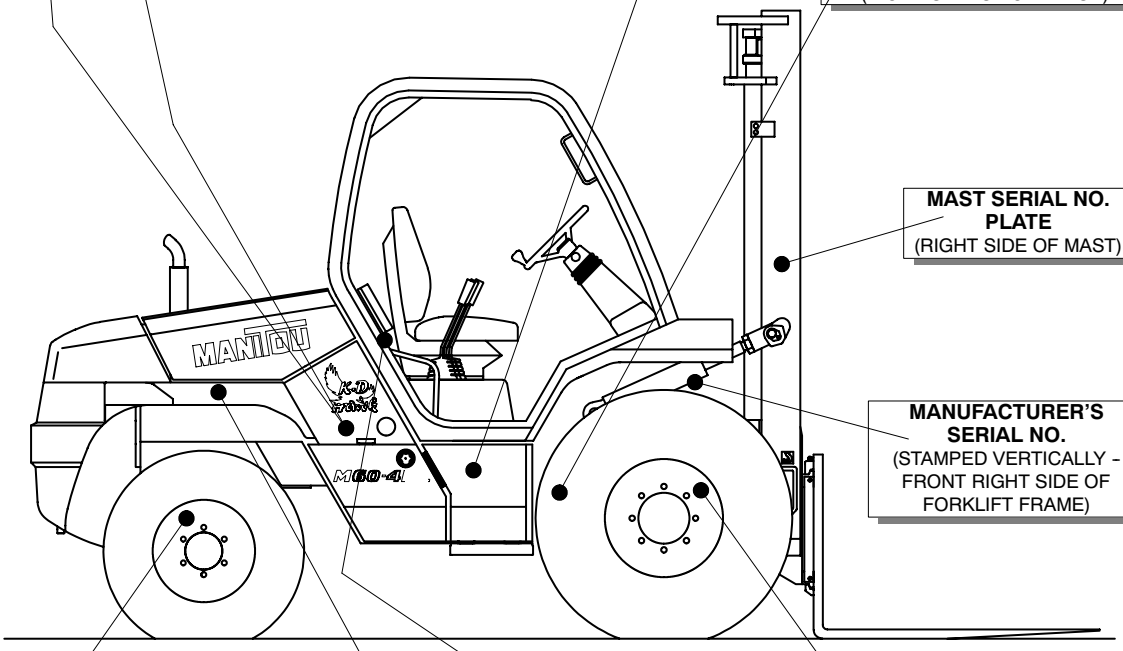


NOTE:

Lift trucks equipped with the TIER I Engine have wheels that are painted Manitou white.
Lift trucks equipped with the TIER II Engine have wheels that are painted Manitou silver.

* Dimensions may vary depending on tires, additional options, etc.

M-SERIES
POWERTRAIN COMPONENT IDENTIFICATION



TURNER 4-SPEED TRANSMISSION IDENTIFICATION PLATE
(LEFT HAND SIDE OF TRANSMISSION)

HYDROSTATIC MOTOR IDENTIFICATION PLATE
(BOTTOM SIDE OF PUMP)

HYDROSTATIC (TRANSMISSION) PUMP IDENTIFICATION PLATE
(BOTTOM SIDE OF PUMP)

2-SPEED GEARBOX (HYDROSTATIC MODELS) IDENTIFICATION PLATE
(RIGHT SIDE OF GEARBOX)

MAST SERIAL NO. PLATE
(RIGHT SIDE OF MAST)

MANUFACTURER'S SERIAL NO.
(STAMPED VERTICALLY - FRONT RIGHT SIDE OF FORKLIFT FRAME)

MANUFACTURER'S SERIAL NO. PLATE
(INSIDE THE CAB)

REAR 4WD STEER AXLE IDENTIFICATION PLATE
(REAR CENTER, UPPER HALF OF AXLE)

ENGINE IDENTIFICATION PLATE
(RIGHT HAND SIDE OF ENGINE BLOCK)

FRONT DRIVE AXLE IDENTIFICATION PLATE
(FRONT CENTER UPPER HALF OF AXLE)

- INTRODUCTION TO SAFETY -

- ROUGH TERRAIN FORKLIFT TRUCK

GENERAL SAFETY STANDARDS - - - - - - - - - - - I

- SAFTETY MESSAGES - VII

- SAFETY DECALS - VIII

- TABLE OF CONTENTS - XV

- OPERATING AND SAFETY INSTRUCTIONS - - - - - - - - - - - - - 1 - 1

- DESCRIPTION - 2 - 1

- MAINTENANCE - 3 - 1

INTRODUCTION TO SAFETY

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS

STUDY THE OPERATOR/SERVICE MANUALS

The information in this manual provides general instructions for the safe operation and maintenance of your forklift truck. This information is vital and must be clearly understood by the operator and serviceman. Study this manual and the Rough Terrain Forklift Safety Manual (part no. 422494) thoroughly and carefully before operating or servicing your forklift. Contact your dealer or Manitou North America, Inc. if you have any questions concerning your forklift, its operation, service or parts. Keep both manuals in the literature box on the forklift available for reference. If either manual becomes illegible or is missing, contact your dealer for replacements immediately. This manual cannot cover every situation that might result in an accident. It is the responsibility of the operator to always remain alert for potential hazards and be prepared to avoid them!

ADDITIONAL RECOMMENDED LITERATURE:

ANSI / ITSDF B56.6 is the national consensus standard for rough terrain forklift trucks. It contains rules about forklift safety, maintenance, safe operation, training, and supervision. Forklift owners should learn this standard and make it available for their operators, service personnel, and supervisors. These standards can be obtained, free of charge, from the Industrial Truck Standards Development Foundation (ITSDF) on their website at www.itsdf.org. The following references are examples from the standard, addressing forklift operators:

A.) OPERATOR TRAINING QUALIFICATIONS

1.) The user shall ensure that operators understand that safe operation is the operator's responsibility. The user shall ensure that operators are knowledgeable of, and observe, all safety rules and practices.
2.) Create an effective operator training program centered around user company's policies, operating conditions, and rough terrain forklift trucks. The program should be presented completely to all new operators and not be condensed for those claiming previous experience.
3.) Information on operator training is available from several sources, including rough terrain forklift truck manufacturers, users, government agencies, etc.
4.) An operator training program should consist of the following:

a.) careful selection of the operator, considering physical qualifications, job attitude, and aptitude;
b.) emphasis on safety of stock, equipment, operator, and other personnel;
c.) citing of rules and why they were formulated;
d.) basic fundamentals of rough terrain forklift truck and component design as related to safety, e.g., in.-lb (N-m) loading, mechanical limitations, center of gravity, stability, etc.;
e.) introduction to equipment, control locations, and functions. Explain how they work when used properly and problems when used improperly.
f.) supervise practice on operating course remote from normal activity and designed to simulate actual operations, e.g., lumber stacking, elevating shingles to the roof, etc.;
g.) oral, written, and operational performance tests and evaluations during and at completion of the course;
h.) refresher courses, which may be condensed versions of the primary course, and periodic "on job" operator evaluation;
i.) understanding of nameplate data and operator instructions and warning information appearing on the rough terrain forklift truck.

B.) GENERAL SAFETY PRACTICES

1.) Rough terrain forklift trucks can cause injury if improperly used or maintained.
2.) Only authorized operators trained to adhere strictly to all operating instructions shall be permitted to operate rough terrain forklift trucks. Unusual operating conditions may require additional safety precautions, training, and special operating instructions.
3.) Modifications and additions which affect capacity or safe operation shall not be preformed without the manufacturer's prior written approval. Where such authorization is granted, capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.
4.) If the rough terrain forklift truck is equipped with front end attachment(s) or optional forks, the user shall see that the truck is marked to identify the forks or attachment(s), show the approximate weight of the truck and fork or attachment combination, and show the capacity of the truck with forks or attachment(s) at maximum elevation with load laterally centered.
5.) The user shall see that all nameplates and caution and instruction markings are in place and legible.
6.) The user shall consider that changes in load dimension may affect rough terrain forklift truck capacity.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

B.) GENERAL SAFETY PRACTICES (cont.)

7.) Where steering can be accomplished with either hand and the steering mechanism is of a type that prevents road reactions from causing the handwheel to spin (power steering or equivalent), steering knobs may be used. When used, steering knobs shall be of a type that can be engaged by the operator's hand from the top and shall be within the periphery of the steering handwheel.
8.) Experience has shown that rough terrain forklift trucks which comply with stability requirements are stable when properly operated. However, improper operation, faulty maintenance, or poor housekeeping may contribute to a condition of instability and defeat the purpose of the requirements.
9.) Users shall give consideration to special operating conditions. The amount of forward and rearward tilt to be used is governed by the application. Although the use of maximum rearward tilt is allowable under certain conditions, such as traveling with the load lowered, the stability of a rough terrain forklift truck as determined by standardized tests does not encompass consideration for excessive tilt at high elevations or the operation of trucks with excessive off-center loads.
10.) Some of the conditions which may affect stability are ground and floor conditions, grade, speed, loading (rough terrain forklift trucks equipped with attachments behave as partially loaded trucks even when operated without a load on the attachment), dynamic and static forces, improper tire inflation, and the judgement exercised by the operator.

C.) OPERATING SAFETY RULES AND PRACTICES

1.) Safe operation is the responsibility of the operator.
2.) This equipment can be dangerous if not used properly. The operator shall develop safe working habits and also be aware of hazardous conditions in order to protect himself, other personnel, the rough terrain forklift truck, and other material.
3.) The operator shall be familiar with the operation and function of all controls and instruments before undertaking to operate the rough terrain forklift truck.
4.) Before operating any rough terrain forklift truck, truck operators shall have read and be familiar with the operator's manual for the particular truck being operated.
5.) Before starting to operate the rough terrain forklift truck:
    a.) be in operating position and fasten seat belt;
    b.) place directional controls in neutral;
    c.) apply brakes;
    d.) start engine.
6.) Do not start or operate the rough terrain forklift truck, any of its functions, or attachments from any place other than the designated operator's position.
7.) Keep hands and feet inside the operator's designated area or compartment. Do not put any part of the body outside the operator compartment of the rough terrain forklift truck.
8.) Never put any part of the body into the mast structure or between the mast and the rough terrain forklift truck.
9.) Never put any part of the body within the reach mechanism of the rough terrain forklift truck or other attachments.
10.) Understand rough terrain forklift limitations and operate the truck in a safe manner so as not to cause injury to personnel.
11.) Do not allow anyone to stand or pass under the elevated portion of any rough terrain forklift truck, whether empty or loaded.
12.) Do not permit passengers to ride on rough terrain forklift trucks.
13.) Check clearance carefully before driving under electrical lines, bridges, etc.
14.) A rough terrain forklift truck is attended when the operator is less than 25 ft (7.6m) from the truck, which remains in his view.
15.) A rough terrain forklift truck is unattended when the operator is 25ft (7.6m) or more from the truck, which remains in his view, or whenever the operator leaves the truck and it is not in his view.
16.) Before leaving the operator's position:
    a.) bring rough terrain forklift truck to a complete stop;
    b.) place directional controls in neutral;
    c.) apply the parking brake;
    d.) lower load-engaging means fully, unless supporting an occupied elevated platform;
    e.) stop the engine;
    f.) if the rough terrain forklift truck must be left on an incline, block the wheels;
    g.) fully lower the load-engaging means.
17.) Maintain a safe distance from the edge of ramps, platforms, and other similar working surfaces.
18.) Do no move railroad cars or trailer with a rough terrain forklift truck.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

C.) OPERATING SAFETY RULES AND PRACTICES (cont.)

19.) Do not use a rough terrain forklift truck for opening or closing railroad car doors.
20.) In areas classified as hazardous, use only rough terrain forklift trucks approved for use in those areas.
21.) Report all accidents involving personnel, building structures, and equipment to the supervisor or as directed.
22.) Do not add to, or modify, the rough terrain forklift truck.
23.) Do not block access to fire aisles, stairways, and fire equipment.
24.) For rough terrain forklift trucks equipped with a differential lock, the lock should not be engaged when driving on the road or at high speeds or when turning. If the lock is engaged when turning, there could be loss of steering control.
25.) Observe all traffic regulations including authorized speed limits. Under normal traffic conditions, keep to the right, maintain a safe distance, based on speed of travel, from the truck ahead; and keep the truck under control at all times.
26.) Yield the right-of-way to pedestrians and emergency vehicles such as ambulances and fire trucks.
27.) Do not pass another truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.
28.) Slow down and sound the audible warning device(s) at cross-aisles and other locations where vision is obstructed.
29.) Cross railroad tracks at an angle wherever possible. Do not park closer than 6 ft (1.8m) to the nearest rail of a railroad track.
30.) Keep a clear view of the path of travel and observe other traffic, personnel, and safe clearances.
31.) If the load being carried obstructs forward view, travel with the load trailing.
32.) Ascend or descend grades slowly and with caution.
    a.) When ascending or descending grades in excess of 5%, loaded rough terrain forklift trucks should be driven with the load upgrade.
    b.) Unloaded rough terrain forklift trucks should be operated on all grades with the load-engaging means downgrade.
    c.) On all grades, the load and load-engaging means shall be tilted back, if applicable, and raised only as far as necessary to clear the road surface.
    d.) Avoid turning, if possible, and use extreme caution on grades, ramps, or inclines; normally travel straight up or down.
33.) Under all travel conditions, operate the rough terrain forklift truck at a speed that will permit it to be brought to a stop in a safe manner.
34.) Travel with load-engaging means or load low and, where possible, tilted back. Do not elevate the load except during stacking.
35.) Make starts, stops, turns, or direction reversals in a smooth manner so as not to shift load and/or overturn the rough terrain forklift truck.
36.) Do not indulge in stunt driving or horseplay.
37.) Slow down for wet and slippery surfaces.
38.) Before driving over a dockboard or bridge plate, be sure that it is properly secured. Drive carefully and slowly across the dockboard or bridge plate, and never exceed its rated capacity.
39.) Do not drive rough terrain forklift trucks onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off engine, and set brakes. It is advisable that all other personnel leave the elevator before truck is allowed to enter or leave.
40.) Avoid running over loose objects on the roadway surface.
41.) When negotiating turns, reduce speed to a safe level, and turn steering handwheel in a smooth sweeping motion. Except when maneuvering at a very low speed, turn the steering handwheel at a moderate, even rate.
42.) Use special care when traveling without load, as the risk of lateral overturning is greater.
43.) Improper use of stabilizer controls (if so equipped) could cause rough terrain forklift truck upset. Always lower the carriage before operating stabilizer controls.
44.) For rough terrain forklift trucks equipped with lateral leveling:
    a.) Always level the frame before raising the boom or mast, with or without a load.
    b.) Lateral leveling should not be used to position an elevated load; instead, lower the load and reposition the rough terrain forklift truck.
45.) Handle only stable or safely arranged loads.
    a.) When handling off-center loads which cannot be centered, operate with extra caution.
    b.) Handle only loads within the capacity of the rough terrain forklift truck.
    c.) Handle loads exceeding the dimensions used to establish rough terrain forklift truck capacity with extra caution. Stability and maneuverability may be adversely affected.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

C.) OPERATING SAFETY RULES AND PRACTICES (cont.)

46.) When attachments are used, extra care shall be taken in securing, manipulating, positioning, and transporting the load. Operate rough terrain forklift trucks equipped with attachments as partially loaded trucks when not handling a load.

47.) Completely engage the load with the load-engaging means. Fork length should be at least two-thirds of load length. Where tilt is provided, carefully tilt the load backward to stabilize the load. Caution should be used in tilting backward with high or segmented loads.

48.) Use extreme care when tilting load forward or backward, particularly when high tiering. Do not tilt forward with load-engaging means elevated except to pick up or deposit a load over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

49.) The handling of suspended loads by means of a crane arm (boom) or other device can introduce dynamic forces affecting the stability of a rough terrain forklift truck. Grades and sudden starts, stops, and turns can cause the load to swing and create a hazard if not externally stabilized. When handling suspended loads:

a.) do not exceed the truck manufacturer's capacity of the rough terrain forklift truck as equipped for handling suspended loads.

b.) only lift the load vertically and never drag it horizontally;

c.) transport the load with the bottom of the load and the mast as low as possible;

d.) with load elevated, maneuver the rough terrain forklift truck slowly and cautiously, and only to the extent necessary to permit lowering to the transport position;

e.) use tag lines to restrain load swing whenever possible.

50.) At the beginning of each shift and before operating the rough terrain forklift truck, check its condition, giving special attention to:

a.) tires and their inflation pressure

b.) warning devices

c.) lights

d.) lift and tilt systems, load-engaging means, chains, cables, and limit switches

e.) brakes

f.) steering mechanism

g.) fuel system(s)

51.) If the rough terrain forklift truck is found to be in need of repair or in any way unsafe, or if it contributes to an unsafe condition, the matter shall be reported immediately to the user's designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

52.) If during operation the rough terrain forklift truck becomes unsafe in any way, the matter shall be reported immediately to the user's designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

53.) Do not make repairs or adjustments unless specifically authorized to do so.

54.) When refueling, smoking in the area shall not be permitted, the engine shall be stopped, and the operator shall not be on the rough terrain forklift
truck.

55.) Spillage of oil or fuel shall be carefully and completely absorbed or evaporated and fuel tank cap replaced before restarting engine.

56.) Do not use open flames when checking electrolyte level in storage batteries, liquid level in fuel tanks, or the condition of LPG fuel lines and connectors.

57.) Do not lift personnel with the forklift. If the forklift must be used to lift people, precautions for the protection of the personnel must be taken (see ITSDF B56.6, chapter 5.15 Elevating Personnel).

D.) SUSPENDED LOADS

A jib or truss boom should ONLY be used to lift and place loads when the machine is stationary and the frame is level. Transporting suspended loads must ALWAYS be done slowly and cautiously, with the boom and load as low as possible. Use taglines to restrict loads from swinging, to avoid overturn.

The handling of suspended loads by means of a truss boom or other similar device can introduce dynamic forces affecting the stability of the machine that are not considered in the stability criteria of industry test standards. Grades and sudden starts, stops and turns can cause the load to swing and create a hazard.

Guidelines for "Free Rigging / Suspended Loads"

1. DO NOT exceed the rated capacity of the telescopic handler as equipped for handling suspended loads. The weight of the rigging must be included as part of the load.

2. During transport, DO NOT raise the load more than 12 inches (305 mm) above the ground, or raise the boom more than 45 degrees.

3. Only lift the load vertically – NEVER drag it horizontally.

4. Use multiple pickup points on the load when possible. Use taglines to restrain the load from swinging and rotating.

5. Start, travel, turn and stop SLOWLY to prevent the load from swinging. DO NOT exceed walking speed.

6. Inspect rigging before use. Rigging must be in good condition and in the U.S. comply with OSHA regulation §1910.184, "Slings," or §1926.251, "Rigging equipment for material handling."

7. Rigging equipment attached to the forks must be secured such that it cannot move either sideways or fore and aft. The load center must not exceed 24 inches (610 mm).

8. DO NOT lift the load with anyone on the load, rigging or lift equipment, and NEVER lift the load over personnel.

9. Beware of the wind, which can cause suspended loads to swing, even with taglines.

10. DO NOT attempt to use frame-leveling to compensate for load swing.

WARNING

U.S. OSHA regulations effective November 8, 2010 (29 CFR Part 1926, Subpart CC - Cranes and Derricks in Construction) include requirements for employers that use powered industrial trucks ("forklifts") configured to hoist (by means of a winch or hook) and move suspended loads horizontally. In particular, this regulation applies to any rough-terrain forklift (e.g., "telescopic handler") equipped with a jib or truss boom with a hook (with or without a winch), or a hook assembly attached to the forks. [Note: This regulation is in addition to the OSHA regulation that requires specific forklift operator training: §1910.178(l).]

When a forklift / telescopic handler is configured and used for hoisting, the employer must ensure that:

1. **Forklift, lift equipment and rigging have been inspected (each shift, month and year) and are in good, safe condition and properly installed.**

2. **An operator's manual and applicable load charts are on the forklift.**

3. **Work zone ground conditions can support the equipment and load. Any hazardous conditions in the work area have been identified, and the operator notified.**

4. **Equipment is being used within its rated capacity and in accordance with the manufacturer's instructions.**

5. **Operator and crew members have been trained in the safe use and operation of the equipment, including how to avoid electrocution.**

6. **During use, no part of the equipment, load line or load will be within the minimum clearance distance specified by OSHA [10 feet (3.0 m), and more for lines rated over 50 kV] of any energized power line, and any taglines used are non-conductive.**

7. **In addition, for lift equipment with a rated capacity greater than 2000 lbs. (907 kg), the employer must ensure that:**

a.) An accessible fire extinguisher is on the forklift;

b.) Monthly and annual inspections are performed and documented, and records retained (three months for monthly, one year for annual);

c.) Before November 10, 2014, operators must have had the additional training and qualification / certification required by OSHA regulations §1926.1427 and §1926.1430.

Note: Refer to the full text of the OSHA crane regulation (29 CFR Part 1926, Subpart CC) for a detailed description

---

CONCLUSION:

1.) ATTEND OPERATOR TRAINING CLASSES

The forklift operator must clearly understand all instructions concerning the safe operation of the forklift and all safety rules and regulations of the work site. They must have successfully completed a training coarse in accordance with the Powered Industrial Truck Standard (29 CFR 1910.178) as described by the Occupational Safety and Health Administration (OSHA). They must be qualified as to their visual, hearing, physical, and mental ability to operate the equipment safely. NEVER use drugs or alcohol while operating a forklift! NEVER operate or allow anyone to operate a forklift when mental alertness or coordination is impaired! An operator on prescription or over-the-counter drugs must consult a medical professional regarding any side effects of the medication that may impair their ability to safely operate the forklift.

2.) CREATE A MAINTENANCE PROGRAM

OSHA recommends a maintenance log, listing repairs requested and completed, for each forklift. Also, “lock out tag procedures” should be utilized. If the forklift malfunctions; park it safely, remove the key, tag “Do Not Use”, and report the problem to the proper authority or authorized service personnel immediately.

ROUGH TERRAIN FORKLIFT TRUCK GENERAL SAFETY STANDARDS (cont.)

2.) CREATE A MAINTENANCE PROGRAM (cont.)

For the best forklift performance and operation, a maintenance program is required. Use the hour meter on the instrument panel to keep maintenance properly scheduled (see SECTION TWO - “Servicing Schedule”). For repairs on major components (engine, transmission, etc.), contact your nearest dealer for a Repair Manual. Do not operate a forklift that is damaged or does not function properly. Only authorized personnel may make repairs or adjustments to the lift truck. After repairs, the lift truck must be tested for safe operation before returning to service.

3.) FORKLIFT KNOWLEDGE

Forklift trucks can cause serious injury if improperly used or maintained. Study all of the manuals provided for your forklift model. Learn the locations and meanings of all safety decals. If any decals are illegible or missing, have them replaced immediately. Make sure all safety features provided by the original manufacturer are in place and function properly. Do not operate a forklift with damaged, missing or unsafe components. Have it repaired by authorized service personnel. Learn the functions of all controls, gauges, indicator lights, etc. on the forklift. Know the speed/gear ranges, braking and steering capabilities, load ratings and clearances. When referring to the location of forklift components, the terms “left”, “right”, “front”, and “rear” are related to the operator seated normally, facing forward in the operator’s seat. If you have any questions about the forklift, consult your supervisor. Failure to fully understand or obey safety warnings can result in serious injury or death!

4.) WORK SITE KNOWLEDGE

Before operating on a work site, learn the rules for movement of people, forklifts and all other traffic. Check the size, weight, and condition of the loads you will be expected to handle. Verify that they are properly secured and safe to transport. Learn where the loads are to be placed, planning your route for a safe approach, watching for hazardous conditions. Will a signal man be required to help place the load? Remove any debris which may cause tire damage or rupture. Plan your route around problem areas or have them corrected. Inform the supervisor of any unsafe conditions observed at the site. Examples of hazards: power lines, cables, low clearance structures, garage doors, telephone pole guide lines, fencing, loose lumber, building materials, drop-offs, trenches, rough/soft spots, oil spills, deep mud, steep inclines, railroad tracks, curbs, etc.. NEVER approach power lines, gas lines or other utilities with the forklift! Always verify that local, state/provincial and federal regulations have been met. Report any accidents involving personnel, building structures, and equipment to the supervisor immediately. Always remain alert - conditions are constantly changing at the work site!

TECHNICAL SUPPORT

All data provided in this manual is subject to production changes, addition of new models, and improved product designs. If a question arises regarding your forklift, please consult your dealer or K-D Manitou, Inc. for the latest information. When ordering service parts or requesting technical information, be prepared to quote the applicable Model/Serial Numbers.

SAFETY MESSAGES

NOTE THE SAFETY ALERT SYMBOL (SHOWN BELOW). IT IDENTIFIES POTENTIAL HAZARDS WHICH, IF NOT AVOIDED MAY RESULT IN INJURY OR DEATH! Also, observe the safety messages places throughout this manual; providing special instructions, telling you when to take precautions and to identify potential hazards. The safety messages are highlighted and outlined in a box similar to those shown in the examples below.

SAFETY ALERT SYMBOL

NOTE or NOTICE
Provides information, special instructions or references about the lift truck.

IMPORTANT
Precautions which must be taken to avoid damage to the lift truck.

CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. May also alert unsafe practices.

WARNING
Indicates a potentially hazardous situation which, if not avoided, *may result in death or serious injury!*

DANGER
Indicates an imminently hazardous situation which, if not avoided, *will result in death or serious injury.*

CALIFORNIA PROPOSITION 65 WARNING

Diesel Engine Exhaust and some of its constituents are known to the State of California to cause cancer, birth defects or other reproductive harm.

WARNING: Battery posts, terminals and related accesories and related accessories contain lead and lead compounds. **Wash hands after handling.**

SAFETY DECALS

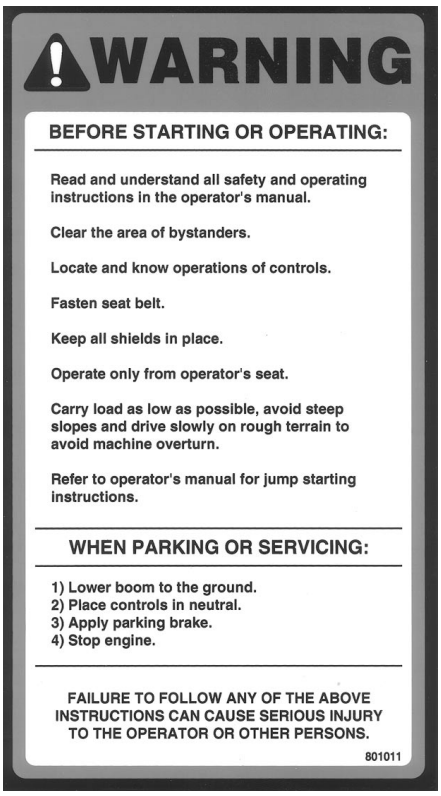
The purpose of this chapter is to introduce you to the safety messages, decals, and nameplates found on your forklift truck. The decals are identified by name, part number, location, and a brief description. (The forklift model logos, and other misc. decals not shown, can be found in your forklift parts manual.) The decals illustrated may not be exactly the same as those installed on your forklift; installation of the decals varies depending on the forklift model, series, decal updates, etc.. The size and location of some decals limit the amount of information that can be placed upon it. For this reason, additional detailed information not found on the decals is provided through-out this manual.

Every decal placed on the lift truck is important; they are constant reminders of safety and instructions that should never be taken for granted. Even experienced operators can be seriously injured or killed by ignoring, refusing to enforce, or forgetting to follow safe operating procedures! Do not assume you know all safety issues concerning the decals. Before operating the lift truck; learn the meaning(s) of the decals as described in this manual. If any decal becomes illegible or missing, have it replaced immediately! Always replace decals using the same decal part no., unless otherwise specified by the manufacturer. For replacement decals not found in your parts manual, contact your nearest dealer. If you have any questions, contact your supervisor or nearest dealer for advice before operating your forklift!

801011

Before Starting - 801011

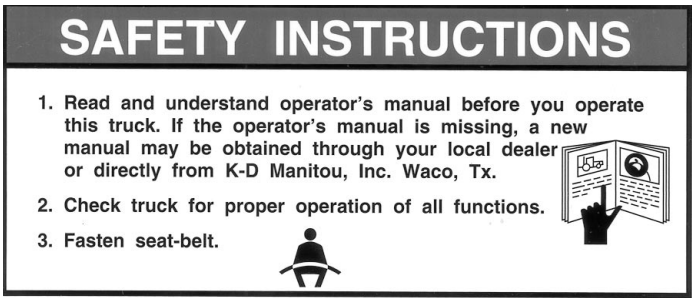
(Boom equipped models). Location: on the brake fluid cover panel (to the left and below the dash panel).


WARNING
BEFORE STARTING OR OPERATING:
Read and understand all safety and operating instructions in the operator's manual.
Clear the area of bystanders.
Locate and know operations of controls.
Fasten seat belt.
Keep all shields in place.
Operate only from operator's seat.
Carry load as low as possible, avoid steep slopes and drive slowly on rough terrain to avoid machine overturn.
Refer to operator's manual for jump starting instructions.
WHEN PARKING OR SERVICING:
1) Lower boom to the ground.
2) Place controls in neutral.
3) Apply parking brake.
4) Stop engine.
FAILURE TO FOLLOW ANY OF THE ABOVE INSTRUCTIONS CAN CAUSE SERIOUS INJURY TO THE OPERATOR OR OTHER PERSONS.
801011

Safety Instructions - 420792

(Mast equipped models). Location: on or near the operator manual storage case, and/or on the dash panel.

Instructions for the forklift operator; before operating the forklift.


SAFETY INSTRUCTIONS
1. Read and understand operator's manual before you operate this truck. If the operator's manual is missing, a new manual may be obtained through your local dealer or directly from K-D Manitou, Inc. Waco, Tx.
2. Check truck for proper operation of all functions.
3. Fasten seat-belt.

Use of Seat Belt - 801012

(Boom equipped models). Location: to the right of the operator, near the hydraulic control lever.

Instructs the operator to always wear the seat belt during operations, and never jump from an over-turning forklift.

DANGER
Always wear seat belt when operating machine.
Never jump from a tipping machine.
Failure to comply may result in serious injury or death.
801012

SAFETY DECALS

Emergency and Parking Brake - 801010

Location: near the park brake lever.

Identifies the Emergency/Parking Brake Lever.

Alarm Must Sound - 496162

Location: on the dash, in direct view of the operator.

The backup alarm must sound when the forklift is placed in reverse gear.

No Riders - 420732

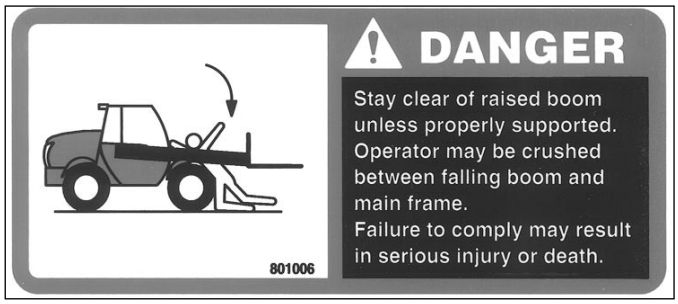
Location: on the cab entrance(s), and on or near wheel fenders and engine cover.

Informs: riders are not allowed on the forklift.

Clear of Raised Boom - 801006

(Boom equipped models). Location: on both sides of the boom nose.

Keep away from unsupported boom.


DANGER
Stay clear of raised boom unless properly supported. Operator may be crushed between falling boom and main frame.
Failure to comply may result in serious injury or death.
801006

Clear of Power Lines - 801007

(Boom equipped models). Location: on both sides of the boom nose.

Keep away from power lines.

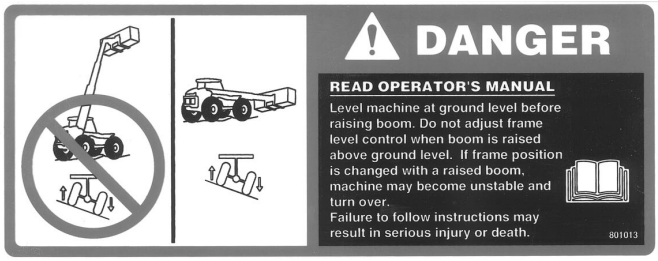
DANGER
Keep machine at least 25 feet from overhead power lines.
Failure to comply may result in serious injury or death by electrocution.
801007

SAFETY DECALS

Use of Frame Leveling - 801013

(Boom equipped models). Location: to the right of the operator near the hydraulic control lever.

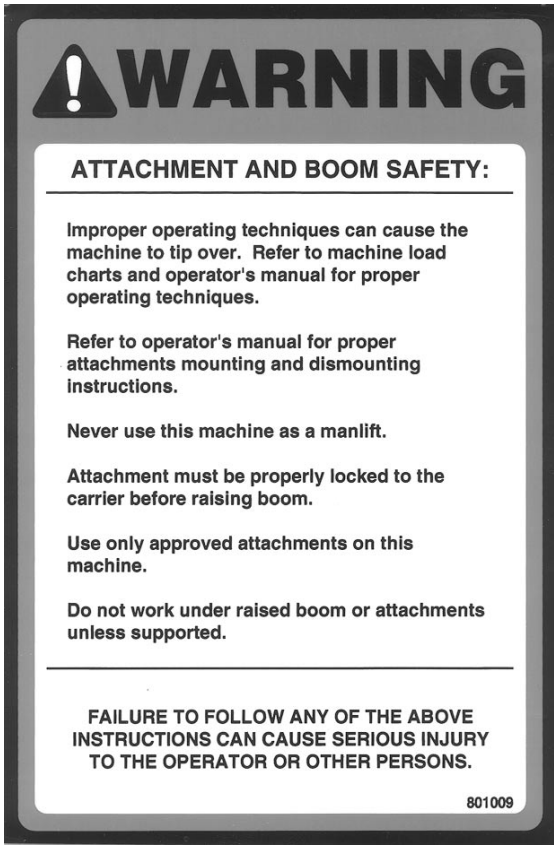
Frame leveling notice; load must be lowered.


DANGER
READ OPERATOR'S MANUAL
Level machine at ground level before raising boom. Do not adjust frame level control when boom is raised above ground level. If frame position is changed with a raised boom, machine may become unstable and turn over.
Failure to follow instructions may result in serious injury or death.
801013

Attachment and Boom Safety - 801009

(Boom equipped models). Location: on both sides of the boom nose.

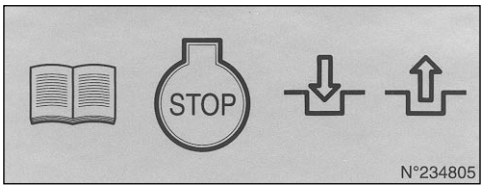
Important reminders of attachment and boom safety.


WARNING
ATTACHMENT AND BOOM SAFETY:
Improper operating techniques can cause the machine to tip over. Refer to machine load charts and operator's manual for proper operating techniques.
Refer to operator's manual for proper attachments mounting and dismounting instructions.
Never use this machine as a manlift.
Attachment must be properly locked to the carrier before raising boom.
Use only approved attachments on this machine.
Do not work under raised boom or attachments unless supported.
FAILURE TO FOLLOW ANY OF THE ABOVE INSTRUCTIONS CAN CAUSE SERIOUS INJURY TO THE OPERATOR OR OTHER PERSONS.
801009

Hydraulic Coupling - 234805

Location: near the quick-disconnect adapters.

Stop the engine and release hydraulic pressure before changing attachments.



Rotating Fan and Belt(s) - 801008

Location: on the radiator near the fan, and on any fan belt/pulley cover(s).

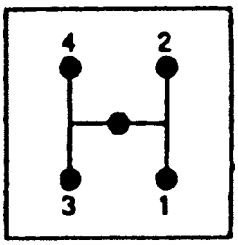
Keep hands and clothing away from rotating fan and belts.

SAFETY DECALS

Gear Shift Pattern - 33460

(4-speed transmission models). Location: near the gear shift lever.

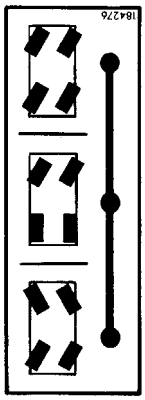
Identifies the gear shift pattern of the forklift transmission.



Steering Mode - 184276

(4 wheel steer equipped models). Location: near the steering mode selection lever.

Identifies the steering mode selection.



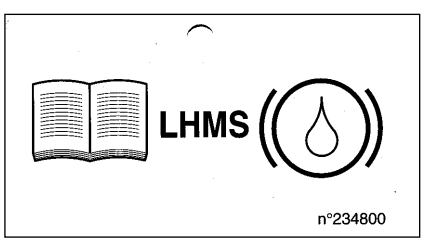
Mineral Oil (Brake Reservoir) - 221322 or 234800 has been replaced by 164091.

Location: near the brake fluid reservoir where applicable.

Refer to the Operator/Service Manual for the correct brake fluid (mineral oil) to be used in the brake system.

221322

234800

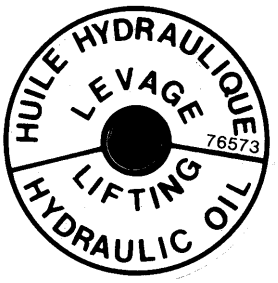


SAFETY DECALS

Hydraulic Oil - 234798 or 76573

Location: on the hydraulic tank or filler cap.

Identifies the hydraulic reservoir (tank) or filler cap.



Hydraulic Oil - 61024

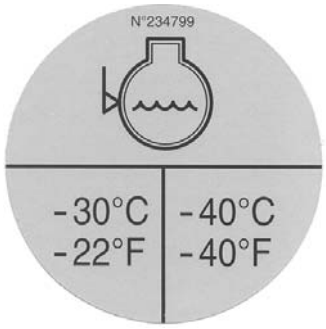
Location: on the hydraulic tank.

Identifies the hydraulic reservoir (tank).

Anti-Freeze - 234799

Location: on the radiator, near the radiator filler cap.

Indicates required minimum to maximum anti-freeze protection (-22^{0}F to -40^{0}F).



Diesel Fuel - 161101

Location: on the fuel tank, near the filler cap.

Identifies the fuel tank, and use of diesel fuel.

No Step - 496735

Location: varies, depending on the forklift model.

Instructs personnel not to use the designated area as a step.

Do Not Tow - 494918

(Hydrostatic equipped models). Location: on the dash, in view of the operator.

Towing the forklift will damage the transmission; refer to the operator's manual.

WARNING
THIS VEHICLE IS EQUIPPED WITH A HYDROSTATIC TRANSMISSION. DO NOT ATTEMPT TO PUSH OR TOW, TRANSMISSION DAMAGE WILL OCCUR. SEE OPERATOR'S MANUAL.
494918

SAFETY DECALS

Attachment Warning - 421016

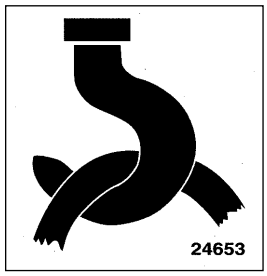
(Boom equipped models). Location: on the boom coupler, near where the retaining shaft is installed.

Reminder to operator; install attachment retaining shaft and safety pin before operations.

WARNING
THE ATTACHMENT RETAINING SHAFT MUST BE IN PLACE AND SECURED WITH THE SAFETY SNAP PIN BEFORE TRUCK OPERATION.
421016

Hook Here - 24653

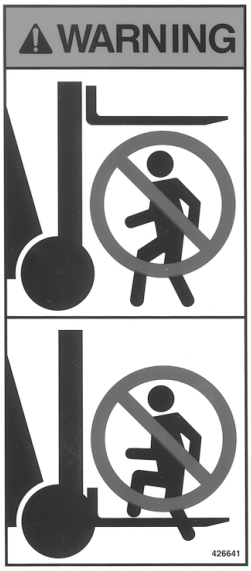
Location: at points provided on the forklift, where straps or chains may be attached to secure the forklift to a trailer during transport.



Fork Safety - 426641

(Mast equipped models). Location: on the front and back side of the mast's outer rails, at eye level (4 required).

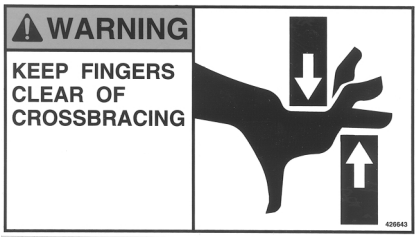
Instructs personnel not to travel beneath or upon the lift truck forks.



Pinch Point, Large, 2.5 x 4.5 in. - 426643
Pinch Point, Small, 1.5 x 2.75 in. - 426642

(Mast equipped models). Location: on the front and rear sides of the mast cross bracing.

Keep fingers away from the mast crossbracing.



HAND THROTTLE DANGER - 804784

(Boom equipped models, option). Location: Near the hand throttle mechanism.

Reminder to operator; set parking brake before operating hand throttle. Disengage hand throttle before leaving the forklift.

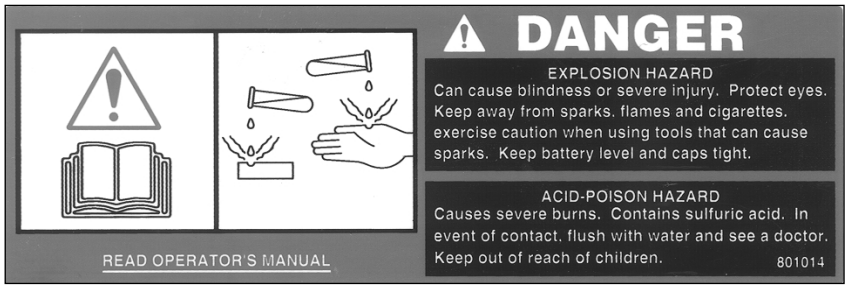
DANGER
DISENGAGE HAND THROTTLE BEFORE LEAVING TRUCK.
OPERATE HAND THROTTLE ONLY WITH PARKING BRAKE SET.
FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY OR DEATH.
804784

SAFETY DECALS

Acid in Battery - 801014

Location: in or near the battery storage compartment.

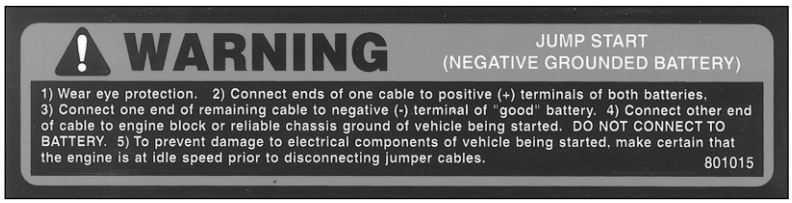
Addresses battery hazards.


DANGER
EXPLOSION HAZARD
Can cause blindness or severe injury. Protect eyes. Keep away from sparks, flames and cigarettes. exercise caution when using tools that can cause sparks. Keep battery level and caps tight.
ACID-POISON HAZARD
Causes severe burns. Contains sulfuric acid. In event of contact, flush with water and see a doctor. Keep out of reach of children.
801014
READ OPERATOR'S MANUAL

Jump Start Battery - 801015

Location: in or near the battery storage compartment.

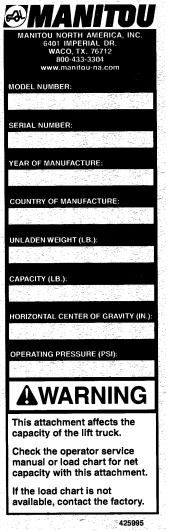
Jump start instructions.


WARNING
JUMP START
(NEGATIVE GROUNDED BATTERY)
1) Wear eye protection. 2) Connect ends of one cable to positive (+) terminals of both batteries. 3) Connect one end of remaining cable to negative (-) terminal of "good" battery. 4) Connect other end of cable to engine block or reliable chassis ground of vehicle being started. DO NOT CONNECT TO BATTERY. 5) To prevent damage to electrical components of vehicle being started, make certain that the engine is at idle speed prior to disconnecting jumper cables.
801015

Attachment Plate - 425995

Location: on the optional removeable forklift attachment.

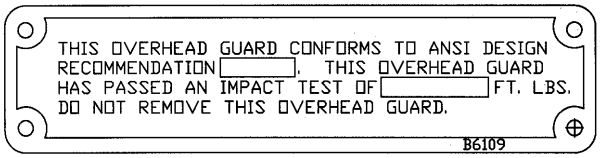
Important manufacturer information about the attachment. Record this information for use when contacting the maufacturer for parts and service.



Overhead Guard Data Plate - B6109

Location: attached to the overhead guard.

Overhead guard conformity.


THIS OVERHEAD GUARD CONFORMS TO ANSI DESIGN RECOMMENDATION [ ]. THIS OVERHEAD GUARD HAS PASSED AN IMPACT TEST OF [ ] FT. LBS.
DO NOT REMOVE THIS OVERHEAD GUARD.
B6109

Forklift Data Plate - 496550

(Boom equipped models)

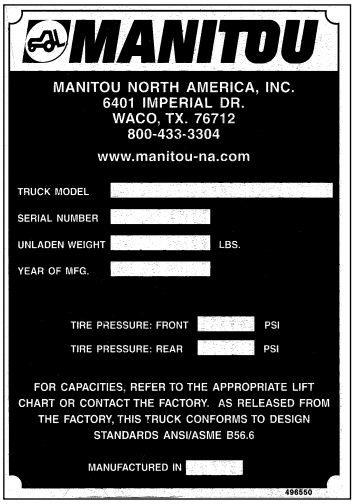
Forklift Data Plate - 496538

(Mast equipped models)

Location: within the operator's compartment.

Important forklift truck identification. Record this information for use when contacting the manufacturer for parts and service.

496550



496538

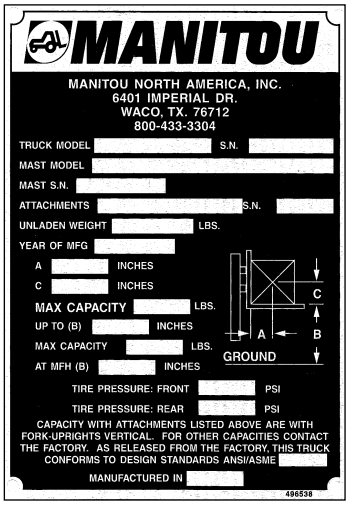


TABLE OF CONTENTS

1 - OPERATING AND SAFETY INSTRUCTIONS	**1 - 1**
– ORIGINAL REPLACEMENT PARTS AND ATTACHMENTS	**1 - 3**
– DRIVER'S OPERATING INSTRUCTIONS	**1 - 4**
• WARNING	1 - 4
• GENERAL INSTRUCTIONS	1 - 5
• OPERATING INSTRUCTIONS	1 - 7
• HANDLING INSTRUCTIONS	1 - 11
• LOAD HANDLING	1 - 13
– MAINTENANCE INSTRUCTIONS OF THE LIFT TRUCK	**1 - 16**
– BEFORE STARTING UP A NEW LIFT TRUCK	**1 - 18**
2 - DESCRIPTION	**2 - 1**
– IDENTIFICATION OF THE LIFT TRUCK	**2 - 4**
– LIFT TRUCK CHARACTERISTICS	**2 - 6**
M30-2 (H) L & M30-4 (H) L	**2 - 9**
– MAST CHARACTERISTICS TABLE	**2 - 10**
– LIFT TRUCK LOAD CHART	**2 - 11**
– INSTRUMENTS AND CONTROLS	**2 - 12**
– TOWING PIN	**2 - 18**
3 - MAINTENANCE	**3 - 1**
– FILTERS CARTRIDGES AND BELTS	**3 - 3**
– LUBRICANTS AND FUEL	**3 - 4**
– SERVICING SCHEDULE	**3 - 6**
– A - DAILY OR EVERY 10 HOURS SERVICE	**3 - 8**
– B - EVERY 50 HOURS SERVICE	**3 - 10**
– C - EVERY 250 HOURS SERVICE	**3 - 16**
– D - EVERY 500 HOURS SERVICE	**3 - 20**
– E - EVERY 1000 HOURS SERVICE	**3 - 26**
– F - EVERY 2000 HOURS SERVICE	**3 - 30**
– G - OCCASIONAL MAINTENANCE	**3 - 32**

INTRODUCTION TO SAFETY

1 - OPERATING AND SAFETY INSTRUCTIONS

ORIGINAL REPLACEMENT PARTS AND ATTACHMENTS

ALL REPAIRS ON OUR LIFT TRUCK MUST BE MADE WITH ORIGINAL PARTS.

WHEN INSTALLING AFTER-MARKET PARTS,

YOU RUN THE RISK - Legally, of being liable in the event of an accident.

- Technically, of causing breakdowns to occur or of reducing your lift truck's service life.

IMPORTANT	*Using counterfeit parts or components not approved by the manufacturer may void contract warranty terms and lead the manufacturer to withdraw the lift truck's certificate of compliance.*

BY USING ORIGINAL PARTS DURING MAINTENANCE OPERATIONS,

YOU ARE LEGALLY COVERED

- Any user who procures parts from another vendor does so at his own risk.
- Any user who modifies his lift truck or has it modified by a service company, must consider that a new item of equipment has been brought onto the market and therefore takes liability for it.
- Any user who copies original parts or has them copied is taking a risk from the legal viewpoint.
- The certificate of compliance only binds the maker for parts chosen or produced under the maker's control.
- The practicalities of maintenance terms are set out by the maker. The maker is in no way liable in the event of the user not complying with such terms.

YOU GET THE BENEFIT OF THE MANUFACTURER'S KNOW-HOW

THE MANUFACTURER BRINGS TO THE USER,

- His know-how and skill.
- Guaranteed quality work.
- Original replacement parts.
- Help with preventive maintenance.
- Effective help with diagnosing faults.
- Enhancements gained from feedback.
- Training for operating staff.
- The manufacturer knows the details of the lift truck design and therefore has the best technological capability to carry out maintenance.

DRIVER'S OPERATING INSTRUCTIONS

WARNING

WHENEVER YOU SEE THIS SYMBOL IN MEANS:

WARNING ! BE CAREFUL ! YOUR SAFETY OR THE SAFETY OF THE LIFT TRUCK IS AT RISK.

- Most accidents connected with the use, maintenance and repair of the lift truck are due to neglect of the basic forklift safety instructions. By being aware of the risks to which you are exposed and by taking the necessary preventive measures, you can avoid accidents.
- Any operation or maneuver not described in the instructions is prohibited, however, any person who does use another method must first ensure that he is not putting himself, another person or the lift truck in danger.
- The manufacturer is not able to anticipate all possible risk situations. Therefore the safety instructions and notices given in the user manual and on the lift truck are not conclusive.

Bending the rules in safety notices, maintenance or repair instructions for your lift truck, may result in serious or even fatal accidents.

We would remind users of the risks in driving at excessive speed with regard to traffic conditions, particularly:

- *Risk of loss of control on loose, rough terrain.*
- *Increased stopping distance.*

The user must remain in full control of his lift truck and should:

- *Adapt his speed to each situation in order to maintain his own safety, that of others and of his equipment.*
- *Always be aware of his stopping distance.*

On the basis of experience, there are a number of possible situations in which operating the lift truck is prohibited. Such foreseeable abnormal uses, the main ones being listed below, are strictly forbidden.

- *The foreseeable abnormal behavior resulting from ordinary neglect, but does not result from any wish to put the machinery to any improper use.*
- *The reflex reactions of a person in the event of a malfunction, incident, fault, etc. during operation of the lift truck.*
- *Behavior resulting from application of the "principle of least action" when performing a task.*
- *For certain machines, the foreseeable behavior of such persons as unauthorized: apprentices, teenagers, handicapped persons and trainees tempted to drive a lift truck. Truck drivers tempted to operate a truck to win a bet, in competition or for their own personal experience.*

The person in charge of the equipment must take these criteria into account when assessing whether or not a person will make a suitable driver.

GENERAL INSTRUCTIONS

A - DRIVER'S OPERATING INSTRUCTIONS

- Read the operator's manual carefully, making sure you understand it.
- The operator's manual must always be kept in the lift truck, in the place provided and in the language understood by the operator.
- Every operation or maneuver not described in the manual must be assumed to be prohibited.
- Respect the safety notices and instructions given on the lift truck.
- It is mandatory to replace all plates or decals which are no longer legible or which have become worn or damaged.

B - AUTHORIZATION TO OPERATE

(Refer to the legislation for each particular country)

- Only qualified personnel may use the lift truck. Its use is subject to authorization to operate being given by the appropriate manager in the user establishment.
- The user should always carry this authorization to operate with him while he is using the lift truck.
- The driver shall not authorize driving the lift truck by another person.
- In addition, the vehicle should be used in accordance with good practice for the profession.

C - MAINTENANCE

- The user must immediately advise his superior if his lift truck is not in good working order or does not comply with the safety notice.
- The operator is prohibited from carrying out any repairs or adjustments himself, unless he has been trained for this purpose. He must keep the lift truck properly cleaned if this is among his responsibilities.
- Carry out daily maintenance (See A - DAILY OR EVERY 10 HOURS SERVICE in SECTION 3 - MAINTENANCE).
- Ensure tires are adapted to the nature of the ground.

  . SAND tires.
  . TURF tires.
  . Snow chains.

  There are optional solutions, consult your agent or dealer.

WARNING	*Replace worn or damaged tires immediately.*

IMPORTANT	*The fitting of foam inflated tires is prohibited and is not guaranteed by the manufacturer, without prior authorization.*

- For your safety and that of others, making any modification to the structure or adjustment of the following components on your lift truck is prohibited.
  . Hydraulic pressure.
  . Setting of limiting devices.
  . Engine speed.
  . Adding additional equipment.

  If this occurs, the manufacturer will be released from any liability.
- To enable the vehicle to be maintained in a state of conformity, we advise you to have your lift truck checked regularly by your agent or dealer. This should be done at least once every 6 months.

D - ENVIRONMENT

- A lift truck operating in an area without fire extinguishing equipment must be equipped with an individual extinguisher. There are optional solutions, consult your agent or dealer.
- Take into account climatic and atmospheric conditions of the operation site.
  - . Protection against frost (See LUBRICANTS AND FUEL in SECTION 3 - MAINTENANCE).
  - . Proper lubricants (Ask your dealer for information).
  - . Engine filtration.
  - . Proper lighting (Work lights, etc.).

  Optional solutions exist, consult your dealer.

WARNING	*Use of a lift truck is prohibited in protected areas (i.e. refinery, explosive atmosphere). For use in these areas, specific equipment is available as an option. Consult your dealer.*

OPERATING INSTRUCTIONS

A - DRIVER'S OPERATING INSTRUCTIONS

- Wear clothes suited for driving the lift truck, avoid loose clothes.
- Never operate the vehicle when hands or feet are wet or soiled with grease or mud.
- For increased comfort, adjust the driver's seat to your requirements.
- The operator must always be in his normal position in the driver's seat. It is prohibited to have arms, legs, or any part of the body, protruding from the cab of the lift truck.
- Fasten your seat belt and adjust it to your requirements.
- The control levers must never be used for any other than their intended purposes (i.e. do not use for climbing onto or down from the lift truck, etc.).
- Never allow a passenger to travel on the lift truck or in the driver's cab.

B - BEFORE STARTING THE LIFT TRUCK

- If the lift truck is new, refer to: BEFORE STARTING UP A NEW LIFT TRUCK in SECTION 1 - OPERATING AND SAFETY INSTRUCTIONS.
- Check the condition of the tires and tire pressures (See CHARACTERISTICS in SECTION 2 - DESCRIPTION).
- Before starting the lift truck, check the different levels:
  - . Engine oil.
  - . Hydraulic reservoir oil.
  - . Transmission oil (where applicable).
  - . Cooling liquid (radiator fluid).
- Also check for possible leaks: oil, fuel or fluids from the lift truck.
- Check the closing and locking latches on the hood.
- Whatever the experience as a truck driver, the operator is advised to familiarize himself with the position and operation of all controls and instruments before operating the lift truck.

C - STARTING THE LIFT TRUCK

SAFETY NOTICE

WARNING	*The lift truck must be started or maneuvered only when the operator is sitting in the driver's cab, his seat belt fastened and adjusted.*

- Never try to start the lift truck by pushing or towing it.

IMPORTANT	*Towing may cause severe damage to the transmission. If necessary, to tow the lift truck in an emergency: See OCCASIONAL MAINTENANCE in SECTION 3 - MAINTENANCE.*

INSTRUCTIONS

- Make sure that the forward/reverse lever is in neutral.
- Turn the ignition key to the position I to activate the electrical system.
- Check the level on the fuel level gauge.
- Turn the ignition key to position II to preheat for 6-15 seconds.

IMPORTANT	*Do not engage the pre-heat for more than 60 seconds at one time. Damage to the glow plug(s) could occur.*

IMPORTANT	*Do not engage the starter motor for more than 15 seconds and apply preheating for 6 - 10 seconds between unsuccessful starting attempts.*

- Press the accelerator pedal and turn the ignition key fully: the engine should then start. Release the ignition key and let the engine run at idle.
- Check all control instruments immediately after starting, when the engine is warm, and at regular intervals during use; this will help to quickly detect any problems which should be corrected without delay.
- If the instruments indicate a problem, safely park the forklift and arrange for the necessary repairs.

D - DRIVING THE LIFT TRUCK

SAFETY NOTICE

- Always drive the lift truck with the forks or attachment at approximately 300 mm (12 in) from the ground, i.e. in the transport position.
- Familiarize yourself with the lift truck on the terrain where it will be used.
- Ensure that the service brakes, horn and the backup alarm are working properly.
- Drive according to, and at an appropriate speed for, the conditions and state of the terrain.
- Slow down before executing a turn.
- In all circumstances make sure you are in control of your speed.
- On damp, slippery or uneven terrain, drive slowly.
- Brake gently, never abruptly.
- Operate the forward/reverse lever with the lift truck in a stationary position and never abruptly.
- Do not drive with your foot on the brake pedal or with the parking brake on.
- Always remember that hydrostatic type steering is extremely sensitive to movement of the steering wheel, turn it gently and not abruptly.
- Do not allow the engine to idle needlessly for a long period.
- Never leave the engine on when the lift truck is unattended.
- Look in the direction of travel and always ensure you have good visibility of the route ahead.
- When working at night, ensure that your lift truck is fitted with full beam lights. There are optional solutions, consult your agent or dealer.
- Drive around obstacles.
- Never move onto a loading platform without having first checked:
  - . That it is suitably positioned and secured.
  - . That the unit to which it is connected (tractor trailer, etc.) will not shift.
  - . That this platform is prescribed for the total weight of the lift truck to be loaded.
  - . That this platform is prescribed for the width of the lift truck.
- Never move onto a foot bridge, floor or freight lift, without being certain that they are prescribed for the weight and size of the lift truck to be loaded and without having checked that they are in sound working order.

WARNING	*Take extreme care when operating around loading platforms, trenches, and scaffolding. Avoid recently dug or backfilled dirt and gravel.*

- When carrying loads, the lift truck must not travel at speeds in excess of 7.5 mph.

INSTRUCTIONS

- Raise the forks or attachment to the travel position approximately 300 mm (12 in) from the ground.
- Shift the forward/reverse lever to the selected direction of travel.
- Release the parking brake and accelerate gradually until the lift truck moves off.

E - STOPPING (PARKING) THE LIFT TRUCK

SAFETY NOTICE

- Before stopping the lift truck after a long working period, let the engine idle for a few moments, to allow the coolant and oil to lower the temperature of the engine and transmission.

IMPORTANT	*Frequently stopping a hot engine will raise the temperature of some components, with the risk of badly damaging them.*

- Never leave the ignition key in the lift truck when the lift truck is unattended.
- When the lift truck is stationary, place the forks or attachment on the ground, apply the parking brake, and place the forward/reverse lever in neutral.
- If the driver has to leave the cab, even for a moment, it is essential to apply the parking brake and place the forward/reverse lever in neutral.
- Make sure that the lift truck is not parked in any position that will interfere with the traffic flow.
- Make sure that the lift truck is parked at least 6 ft from the track of a railway.
- In the event of prolonged parking on a site: protect the lift truck from bad weather, particularly from frost (check the level of antifreeze), close the rear windows, lock the cab doors, and ensure that the hood is properly secured (where applicable).

INSTRUCTIONS

- Park the lift truck on flat ground or on an incline of less than 15% grade.
- Release the accelerator pedal and stop the lift truck.
- Place the forward/reverse lever in neutral.
- Apply the parking brake.
- Lower the forks or attachment to rest on the ground.
- Turn the engine off.
- Remove the pressure in the hydraulic circuits by using the hydraulic controls.
- Remove the ignition key.
- Check the closing and locking of doors, windows and hood (where applicable).

WARNING	*For your safety and the safety of others, before leaving the driver's cab, ensure that you have carried out all operations for safely parking the lift truck.*

F - DRIVING THE LIFT TRUCK ON THE PUBLIC HIGHWAY

SAFETY INSTRUCTIONS

- When driving a lift truck on roads open to public traffic, observe the provisions of the Highway Code.
- When on public roads, lift truck drivers must abide by the general provisions relative to highway traffic.
- The lift truck must conform to the provisions of the Local Highway Code. If necessary, optional solutions exist, consult your dealer.

CAUTION	*Transport of loads on the public highway is forbidden and attachments mounted on the lift truck must be fitted with equipment in accordance with regulations or removed.*

INSTRUCTIONS
- Ensure that the flashing light is in position and that it is working properly (where applicable).
- Check for proper operation and cleanliness of lights, turn indicators and windshield wiper(s) (where applicable).
- Check the adjustment of the rear view mirrors (where applicable).
- Ensure that the fuel level is sufficient.
- Place the attachment at 300 mm (12 in) from the ground.

G - OPERATING THE LIFT TRUCK WITH A TRAILER
- Before operating with a trailer, consult the proper authority in your country (maximum travel speed, braking, maximum weight of trailer, etc.).
- Do not forget to connect the lift truck's electrical equipment to the trailer.
- Do not use a non-braked trailer if the unit weight of a load exceeds that imposed by the highway code.
- Do not use a non-braked trailer without braking equipment for the trailer on the lift truck.
- Do not forget to connect the lift truck's braking equipment to that of the trailer.
- The maximum vertical pull on the trailer hook must not exceed 1500 daN (3372 lbs).
- The authorized total towed weight (A.T.T.W.) must not exceed the maximum weight authorized by the manufacturer (Consult the manufacturer's plate on your lift truck).

IF NECESSARY, CONSULT YOUR DEALER.

HANDLING INSTRUCTIONS

A - GENERAL

- Check for the correct functioning of your lift truck's attachments.
- Do not attempt operations which exceed the capacities of your lift truck or attachments.
- It is prohibited to increase the counterweight value in any way.
- It is prohibited to transport or carry persons in or on the lift truck, unless it is equipped to do so.
- Avoid traveling for a long distance in reverse.

B - ATTACHMENTS

- Ensure that the attachment is correctly fitted and locked to its frame.
- Always conform to the limits on the load chart for the lift truck and/or attachment.
- Ensure that pallets, cases, etc, are in good order and suitable for the load before it is lifted.
- Position the forks perpendicular to the load to be lifted, taking into account the load's center of gravity.
- Never lift a load with a single fork.
- Never lift a sling load with a single fork or with the carriage. Optional solutions exist, consult your dealer.
- Ensure that the quick-fit hydraulic connections on the attachment system are clean and protected.

IMPORTANT

Before changing an attachment with hydraulic function(s), and to avoid damaging the quick-fit hydraulic connections:
- Place the attachment in the closed position, flat on the ground (For unstable attachments, ensure they are secured using wedges or blocks). - Switch off the engine. - Remove pressure from the attachment hydraulic system by working the related hydraulic controls.

IMPORTANT

Only specific attachments approved by MANITOU may be used on specific lift trucks. The manufacturer's liability will be voided in case of modification(s) without prior written permission.

Maximum loads are defined by the capacity of a lift truck taking into account the attachment's mass and center of gravity. In the event of the attachment having less capacity than the lift truck, never exceed its limit.

C - ENVIRONMENT

- Signaling and lighting on the lift truck must conform to the conditions of use. In addition to the standard equipment mounted on your lift truck, options are available: road lighting, flashing light, front lights, rear lights, etc. Consult your agent or dealer.
- Take care when raising the load, always checking that no object or person is in the path of movement; avoid any incorrect or abrupt maneuvers.
- When working around power lines or cables, ensure that the safety distance between the working area of the lift truck and the power line is sufficient.

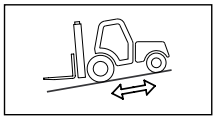
⚠WARNING

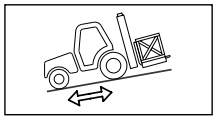
Consult your local electrical agency: You could be electrocuted or seriously injured if you operate or park the lift truck too close to power cables. You must ensure that the safety rules on the site conform to the local regulations regarding forklift operations near power cables.

- Do not allow personell near the working area of the lift truck or allow them to pass beneath an elevated load.
- When operating on a slope, before raising the mast, ensure that the terrain is as level as possible. Lift trucks fitted with frame leveling may work on a steeper incline provided the greatest part of the slope is corrected.

Travelling on a longitudinal slope:

- Drive and brake gently.
- Moving without load: Forks or attachment facing downhill.
- Moving with load: Forks or attachment facing uphill.





- Before depositing a load:
- Ensure that the loading platform or pile is capable of bearing the weight.
- Check the stability and firmness of the ground before depositing a load.

D - HANDLING

- Always consider safety; transport only balanced and correctly secured loads, avoid any risk of tipping.
- Fully engage forks under the load and transport it in a low position (Approximately 12 in. from the ground), the mast tilting backwards.
- For obvious reasons regarding the lift truck's stability and clear visibility of the surrounding area; maneuver the lift truck only when the mast is in the tranport position (Approximately 12 in. from the ground) and the mast tilting back.
- Do not maneuver the lift truck with the mast in the raised position unless under exceptional circumstances and then with extreme caution, at very low speed, and using gentle braking. Ensure that visibility is adequate. Use a signal person to guide you along when necessary.
- Never shift the position of the load while the lift truck is in motion.
- The simultaneous use of two lift trucks to handle heavy or bulky loads is a dangerous maneuver, requiring specific precautions. This should only be done in exceptional circumstances and in the presence of a handling manager.
- Never drive too fast or brake abruptly when carrying a load.
- Check the load constantly, particularly when turning corners and especially if it is bulky.
- Secure unstable loads.
- Handle loads with caution, at slow speed, without sudden jerks when moving them at significant heights and mast extention.

WARNING	*In the event of high winds or storms, do not handle work that jeopardizes the stability of the lift truck and its load, particularly if the load catches the wind.*

- Do not change direction sharply or at high speed.

DANGER	*In the event of the lift truck overturning, do not try to leave the cab during the incident. YOUR BEST PROTECTION IS TO STAY FASTENED IN THE CAB.*

- Apply the parking brake when lifting or depositing a difficult load or when on an incline.
- Do not park the lift truck with the load in an elevated position.
- Do not leave a loaded lift truck with the parking brake applied on an incline which exceeds 15%.

E - VISIBILITY

- If the visibility in forward motion is not sufficient because of the bulkiness of the load, drive in reverse motion. This maneuver must remain exceptional and only for short distances.
- Ensure you have good visibility (Clean windows, adequate lighting, correctly adjusted rear view mirror, etc.).

IF NECESSARY, CONSULT YOUR DEALER.

LOAD HANDLING

CAUTION

Carrying a load greater than the rated capacity of the lift truck or attachment is prohibited.

WEIGHT OF LOAD AND CENTER OF GRAVITY

- Before taking up a load, you must know its weight and center of gravity.
- The load chart relating to your lift truck is valid for a weight with its center of gravity 24 in. from the heel of the forks (Fig. A). For other capacities, consult your dealer.

- For irregular loads, determine the center of gravity in the transverse direction before handling (Fig. B).

CAUTION

For loads with a moving center of gravity (i.e., liquids), take into account the variations of the center of gravity in order to determine the load to be handled (Consult your agent or dealer). Be vigilant and take extra care to limit these variations as much as possible.

TAKING UP A LOAD ON THE GROUND

- Position the lift truck perpendicular to the load, with the forks in a horizontal position (Fig. C).
- Adjust the fork spread and centering in relation to the load (Fig. D) (Optional solutions exist, consult your dealer).

WARNING

Beware of the risks of trapping or injuring limbs when manually adjusting the forks. Always maintain an equal distance between the forks and the center of the carriage in order to keep the load completely stable.

- Move the lift truck forward slowly (1), maneuvering the forks under the load (Fig. E), if necessary, slightly lift the mast (2) while approaching the load.
- Apply the parking brake and place the forward/reverse lever in neutral.
- Slightly lift the load (1), incline the mast (2) backwards in the transport position (Fig. F).

CAUTION

Tilt the load sufficiently backwards to ensure its stability (to avoid loss of load on braking) without upsetting the balance of the load.

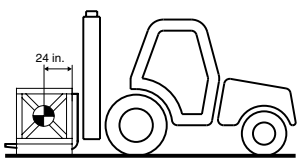
TAKING UP A HIGH LOAD

WARNING

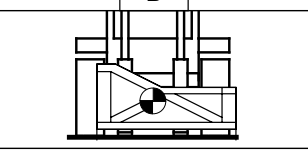
Under no circumstances should you pick up a load if the lift truck is not in a horizontal (level) position. (See HORIZONTAL POSITION OF THE LIFT TRUCK).

- Ensure that the forks will easily pass under the load.
- Position the lift truck perpendicular to the load, with the forks in a horizontal position (Fig. G).

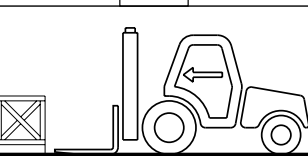
A



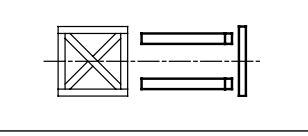
B



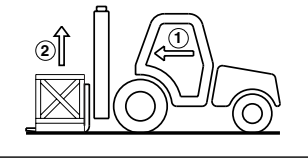
C



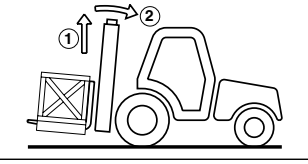
D



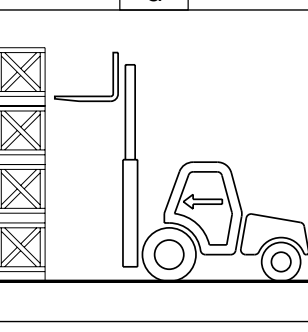
E



F

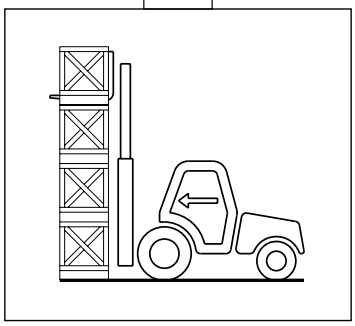


G



Maneuvering gently and carefully, place the forks under the load (Fig. H). Apply the parking brake and place the forward/reverse lever in neutral.

H

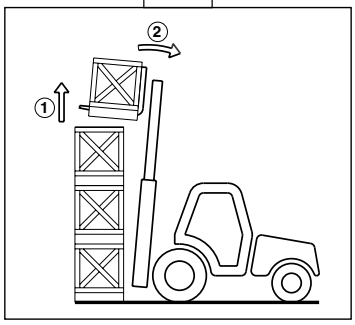


- Slightly lift the load (1) and incline the mast (2) backwards to stabilize the load (Fig. I).

CAUTION

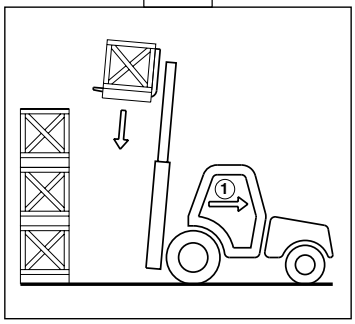
Tilt the load sufficiently backwards to ensure its stability (to avoid loss of load on braking) without upsetting the balance of the load.

I



- Maneuvering very gently and carefully, back the lift truck to clear the pile, and bring the load into the transport position (Fig. J).

J



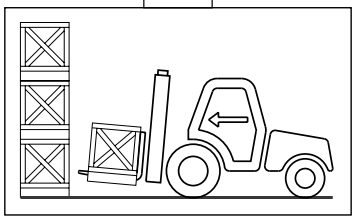
LAYING (PLACING) A HIGH LOAD

- Approach the pile with the load in the transport position (Fig. K).

WARNING

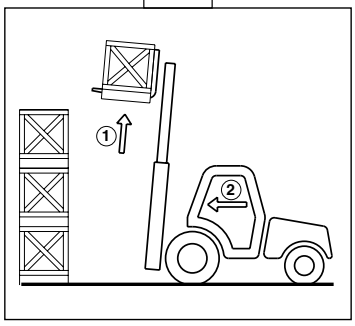
Under no circumstances should you place a load if the lift truck is not in a horizontal position. (See: HORIZONTAL POSITION OF THE LIFT TRUCK).

K



- Lift the mast (1) until the load is above the pile, and move the lift truck forward (2) (Fig. L) maneuvering very gently and carefully. When the load is in position, apply the parking brake and place the forward/reverse lever in neutral.

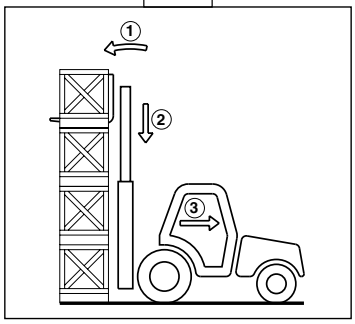
L



- Place the load in a horizontal position (1) and lay it down on the pile (2) while checking the correct positioning of the load (Fig. M).

- Maneuvering very gently and carefully, lower the forks to release the load and reverse the lift truck. Then lower the forks into the transport position.

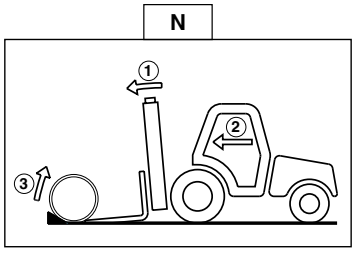
M



TAKING UP A NON PALLETIZED LOAD

- Tilt the carriage (1) forwards and move the lift truck forward (2) while simultaneously crowding the carriage backwards to slip the forks under the load (Fig. N). If necessary, wedge the load with blocks.

N



MAINTENANCE INSTRUCTIONS OF THE LIFT TRUCK

MAINTENANCE INSTRUCTIONS

A - GENERAL

- Read the operator's manual carefully and ensure you understand it.
- Stop the engine, when servicing or repair is necessary.
- Wear clothes suitable for the maintenance of the lift truck, avoid wearing jewelry and loose clothes. Tie and protect your hair, if necessary.
- Ensure the area is sufficiently ventilated before starting the lift truck

IMPORTANT	*Make sure that the disposal of process materials and spare parts is carried out in a safe and ecological manner.*

- Make repairs immediately, including minor repairs.
- Repair all leaks immediately.
- When replacing hydraulic hose assemblies, use only factory approved compontents. Tie-wraps, hose clamps and protective hose sleeves which are damaged or missing must be replaced. Secure all hose assemblies to prevent hose damages; keep hoses away from sharp corners, rubbing movements and interference with forklift operations.
- Do not attempt to loosen unions, hoses or any hydraulic component with the circuit under pressure.

⚠ WARNING	*The handling and removal of the balancing valves which may be fitted to the cylinders of your lift truck can be dangerous. A balancing valve must be removed only after the cylinder is at rest and the hydraulic circuit is depressurized.* ***This operation must be performed by authorized service personnel only!***

- Do not smoke or approach the lift truck with a flame while the fuel tank is open or is being filled.
- Take care not to burn yourself (Exhaust, radiator, engine, etc.).
- Disconnect the negative cable terminal (-) from the top of the battery before working on the electrical circuit or on the lift truck (i.e., welding).
- Do not drop or place metallic objects on the battery.
- When welding on the lift truck, connect the negative cable from the equipment directly to the part being welded, so as to avoid high tension current passing through the alternator.

B - MAINTENANCE

- The maintenance and compliance of the lift truck are mandatory.
- Perform daily maintenance (See A - DAILY OR EVERY 10 HOURS SERVICE in SECTION 3 - MAINTENANCE).
- Do not run the engine without the air filter, or with oil, water or fuel leaks.

⚠ WARNING	*Wait for the engine to cool before removing the radiator cap.*

- Change the filter cartridges (See FILTERS CARTRIDGES AND BELTS in SECTION 3 - MAINTENANCE).

C - LEVELS

- Use the recommended lubricants (Never use contaminated lubricants).
- Do not fill the fuel tank while the engine is running.
- Fill the fuel tank only in the areas specified for this purpose.
- Do not fill the fuel tank to the maximum level.

D - WASHING

- Clean the lift truck or at least the service area on the truck before servicing.
- Remember to close the doors and the windows of the cab when power washing.
- During washing, avoid the articulations, electrical components and connections.

IMPORTANT	*Protect components susceptible of being damaged; from penetration of water, steam or cleaning agents; particularly electrical components, connections, and the injection pump.*

- Keep the lift truck clean of any fuel, oil or grease residue.

FOR ANY SERVICING OTHER THAN REGULAR MAINTENANCE, CONSULT YOUR DEALER.

BEFORE STARTING UP A NEW LIFT TRUCK

INTRODUCTION

- Our lift trucks have been designed for easy handling by the operator and maximum ease of maintenance for the mechanic.
- Before operating the lift truck, the user should carefully read and understand the various sections of this manual which have been provided to solve driving and maintenance problems. By following these instructions the user will be able to take full advantage of the versatility of this lift truck.
- The operator must familiarize himself with the positions and functions of all controls and instruments before operating the lift truck.

IMPORTANT	*Do not attempt to start a new lift truck before the following checks have been carried out:*

LUBRICATION

- Check that the correct grades of oils and grease that are required are available; see SERVICING SCHEDULE in SECTION 3 - MAINTENANCE and top up if necessary.

IMPORTANT	*For operation under average climatic conditions, i.e. between -15 °C and + 35 °C (5° to 95°F), correct levels of lubricants in all the circuits are provided in production. For operation under more severe climatic conditions, before starting up, it is necessary to drain all the circuits, then add the correct levels of lubricants properly suited to the relevant ambient temperatures. It is the same for the cooling fluid (Contact your dealer for information, if necessary).*

DRY AIR FILTER

- Ensure that the air filter is undamaged and not blocked.
- Tighten the fastening devices if necessary.

IMPORTANT	*Never run the engine with the air filter removed or damaged.*

COOLING SYSTEM

- Do not start the lift truck without checking the radiator coolant level or if the fan belt is damaged or broken.

HYDRAULIC SYSTEM

- Check for leaks from the hoses, connections, and components. If necessary, tighten or repair the defective connections.
- Also check that the tank oil level is correct.

TIRES

- Make sure that the wheel nuts are correctly tightened (See A - DAILY OR EVERY 10 HOURS SERVICE in SECTION 3 - MAINTENANCE) and that the tire pressures are correct (See CHARACTERISTICS in SECTION 2 - DESCRIPTION).

FUEL SYSTEM

- Check that all fuel lines are secured.
- If necessary drain the fuel filter and bleed the fuel system of air.

ELECTRICAL CIRCUIT

- The original equipment battery is maintenance free, requiring replacement only when it has tested faulty.
- If the original maintenance free battery has been replaced with one that requires maintenance, check the battery owner's manual for proper care.
- Check the components of the electrical system, the connections and fastening devices.

IF NECESSARY, CONSULT YOUR DEALER.

2 - DESCRIPTION

MANITOU
MANITOU
M30-2H

IDENTIFICATION OF THE LIFT TRUCK

As our policy is to promote a constant improvement of our products, our range of lift trucks may undergo certain modifications, without prior notice to our customers.

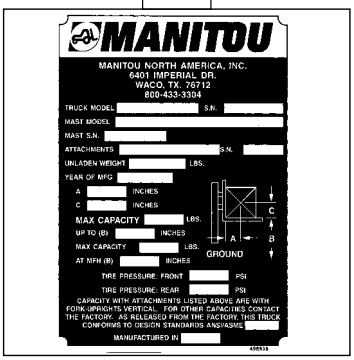
When ordering parts, or seeking technical information, be prepared to specify the component's model and serial numbers.

NOTE: It is recommended that the following numbers be placed in the spaces provided, upon delivery of the lift truck.

LIFT TRUCK IDENTIFICATION (FIG. A)

- Truck Model _____
- Truck Serial No. _____
- Mast Model _____
- Mast Serial No. _____
- Attachment _____
- Attachment Serial No. _____
- Date of manufacture _____

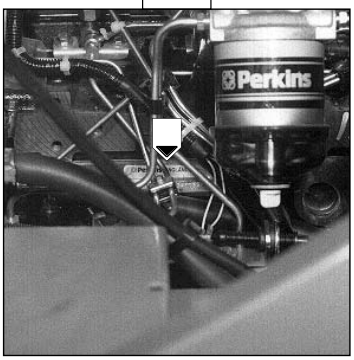
A



ENGINE (FIG. B)

- Engine No. _____

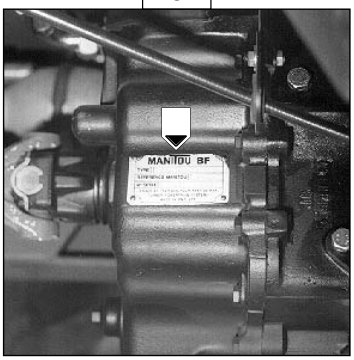
B



TRANSMISSION, 4-SPEED MODELS ONLY (FIG. C)

- Type _____
- MANITOU reference _____
- Serial No. _____

C



HYDROSTATIC TRANSMISSION, HYDROSTATIC MODELS ONLY (FIG. D)

- Model No. _____
- Serial No. _____

HYDROSTATIC MOTOR, HYDROSTATIC MODELS ONLY (FIG. E)

- Type _____
- Serial No. _____

E

D

GEARBOX (2 SPEED), HYDROSTATIC MODELS ONLY (FIG. F)

- Type _____
- Serial No. _____
- MANITOU reference _____

F

FRONT AXLE (FIG. G)

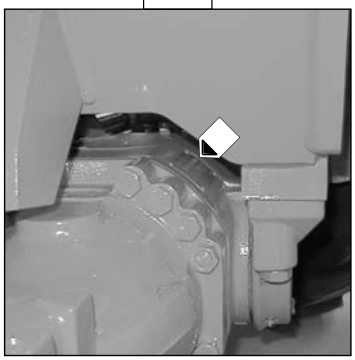
- Type _____
- Serial No. _____
- MANITOU reference _____

G

REAR AXLE, 4WD MODELS ONLY (FIG. H)

- Type _____
- Serial No. _____
- MANITOU reference _____

H



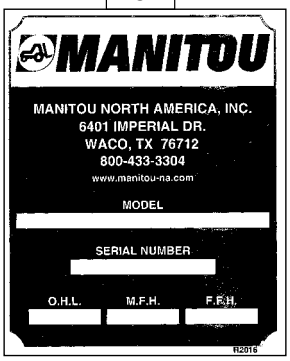
OVERHEAD GUARD OR CAB (FIG. I)

- Type _____

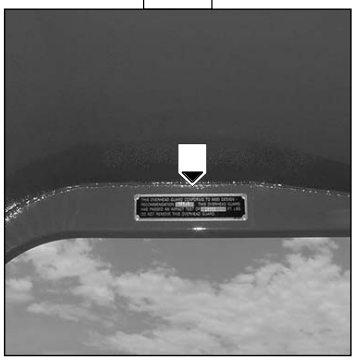
MAST (FIG. J)

- Mast Model No. _____
- Mast Serial No. _____

J



I



LIFT TRUCK CHARACTERISTICS

ENGINE AND FUEL SYSTEM

- Engine Models	**TIER II - PERKINS 1104C-44 / CAT 3054C**
- Number of cylinders	4 in line
- Number of strokes	4
- Suction	Natural
- Injection system	Direct
- Ignition sequence	1.3.4.2.
- Clearance of rocker valve (Cold)	
. Inlet	0,20 mm (0.008 in)
. Exhaust	0,45 mm (0.018 in)
- Capacity	4.4 L (269 cu. in.)
- Bore	105mm (4.13 in.)
- Stroke	127 mm (5.0 in)
- Compression ratio	19.3:1
- Nominal rating loaded	2200 rpm
- Rating slow unladen	825 rpm
- Max. rating unladen	2500 rpm
- Power ISO/TR 14396 (CV-KW)	84hp / 61.5 kw
- Maximum torque ISO/TR 14396	223 ft/lbs @ 1400 rpm
- Air cleaner	Dry 3 microns
- Injection pump	Delphi Type DP210
- Capacity, Crankcase Oil	8.5 - 9 qts.
- Fuel Tank	26 gal tank

COOLING CIRCUIT

- Type	By water
- Fan	Suction (Puller)
. Number of blades	10
. Diameter	457 mm (18 in)
- Thermostat	
. Start opening	77 °C to 85 °C (180°F)
. Full opening	92 °C to 98 °C (203°F)
- Capacity	5 gal

ELECTRIC CIRCUIT

- Earth	Negative
- Battery	12 V - 900 CCA @ 32°F, 750 CCA @ 0°F
- Alternator	
. Type	12 V - 65 Amp
. Tension regulator	Incorporated into the alternator
- Starter	
. Type	12 V

4-SPEED TRANSMISSION (4-SPEED MODELS)

- Type	**TURNER POWERTRAIN SYSTEMS SACHS**
- Torque converter	
- Gear box	
. Number of forward/reverse speeds	4
- Gear reverser	Electro-hydraulic
- Capacity	4 gal

HYDROSTATIC TRANSMISSION (HYDROSTATIC MODELS)

HYDROSTATIC PUMP	**REXROTH** (Variable displacement)
- Type	**A4VG56DA** With variable cubic capacity and with automatic power governor.
- Gear reverser	Electromagnetic 12V.
- Inching control	Hydraulic by valve TH7
- Main pump	
. Capacity MAXI	56 cm^3 (3.42 cu in)
. Capacity MINI	0 cm^3
. MAX. flow rate	141,68 L/min (37.43 gal/min)
. Working pressure	5510 psi
HYDROSTATIC MOTOR	**REXROTH** (Variable displacement)
- Type	**A6VM107DA**

FRONT AXLE

- Type	**DANA**
- Hub reducers	Epicyclic
- Differential lock	Foot button. Hydraulic
- Capacity	Differential 1.8 gal /Reducers 0.2 gal

REAR AXLE, 4WD ONLY

- Type	**DANA**
- Hub reducers	Epicyclic
- Capacity	Differential 1.8 gal /Reducers 0.2 gal

BRAKE

- Service brake	Foot pedal. Hydraulic brake, applied on the front wheels.
. Type	Multidisc brake immersed in oil.
- Parking brake	Mechanical hand lever applied on the front wheels.
. Type	Multidisc brake immersed in oil.

HYDRAULIC CIRCUIT

- Type of pump	Gear pump with flow divider
. Capacity	37 cm3 (2.26 cu in)
. Flow rate at full speed	92,5 L/mn (24.18 gal/min)
- Steering direction	
. Flow rate at full speed	Load control system
. Pressure	145 Bar (2102 psi)
- Filtration	
. Return	10 Microns
. Suction	100 Microns
- Accumulator	
. Capacities	0,7 L (0.74 qts)
. Pressure	100 Bar (1450 psi)
- Capacity	26 gal tank

SPECIFICATIONS

- Travel speeds forward/reverse, loaded/unloaded (approx.):

4-Speed, 81 in. Models:

1st gear - 2.5 mph	2nd gear - 5.0 mph
3rd gear - 10 mph	4th gear - 16 mph

4-Speed, 77 in. Model:

1st gear - 2.0 mph	2nd gear - 4.0 mph
3rd gear - 8.0 mph	4th gear - 12 mph

Hydrostatic, 81 in. Models:

Low gear - 9 mph	High gear - 17 mph

Hydrostatic, 77 in. Model:

Low gear - 8.0 mph	High gear - 15 mph

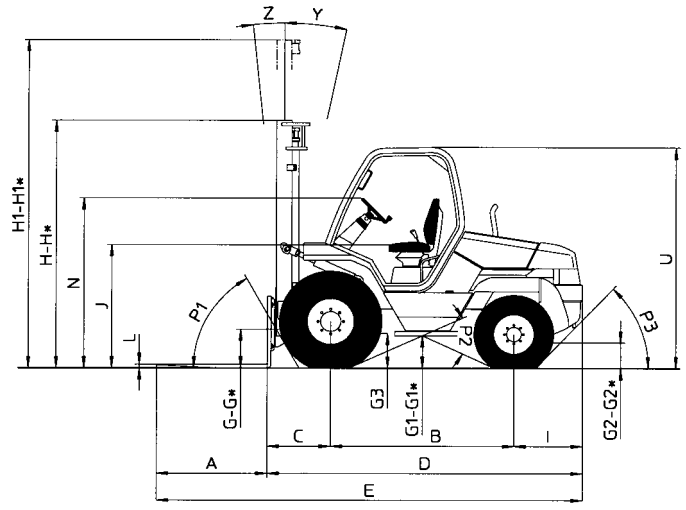
- Standard lift height varies per Mast Model - 10 to 22 ft.

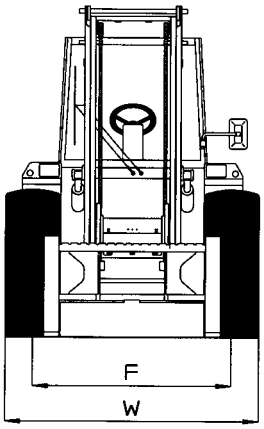
- Mast Side Shift 6 in. total

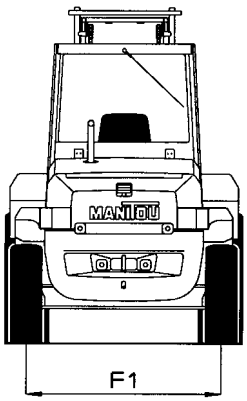
- Load center 24 in.

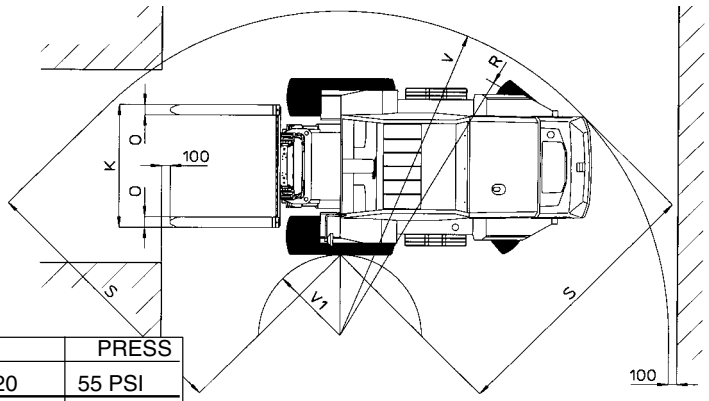
M30-2 (H) & M30-4 (H)

		81" cab w/ 17.5X24 R4 drive	77" cab w/ 14.5R20 XM 27 drive
A		48"	48"
B		84"	84"
C	34" - 37" w/ rotator		
D	148" -		
E	196" – 199" w/ rotator		
F		67.5"	67.5"
F1		71.5"	68.5"
G		13"	
G*			
G1 (2WD)		17.5"	14"
G1 (4WD)		15"	
G2 (2WD)		12.5"	12.5"
G2 (4WD)		9.5"	9.5"
G3		17.5"/18.5" (L version)	13.5"
H			
H*			
H1			
H1*			
I		30"	30"
J			
K		48"	48"
L		5"	5"
N			
O		1.75"	1.75"
P1		43°	
P2			
P3		52°	
R (2WD)		117"	
R (4WD)			
T			
U		81"	77"
V		123"	
V1			
W		85"	82"
Y	Varies - 10°/15°		
Z	Varies - 20°/45°		









M30 TIRES	MAKE	SIZE	PRESS
FRONT 77" Cab	MICHELIN	375X75R20	55 PSI
FRONT 77" Cab	OTR	15X19.5	60 PSI
FRONT 81" Cab	TITAN	17.5X24	32 PSI
FRONT 81" Cab	GOOD YEAR	16.9X24	35 PSI
FRONT 81" Cab	MICHELIN	17.5X24	39 PSI
REAR 77" Cab	OTR	12X16.5	65 PSI
REAR 77" Cab	MICHELIN	12X16.5 XZSL	65 PSI
REAR 81" Cab	OTR	12X16.5	65 PSI
REAR 81" Cab	MICHELIN	12X16.5 XZSL	65 PSI

IMPORTANT

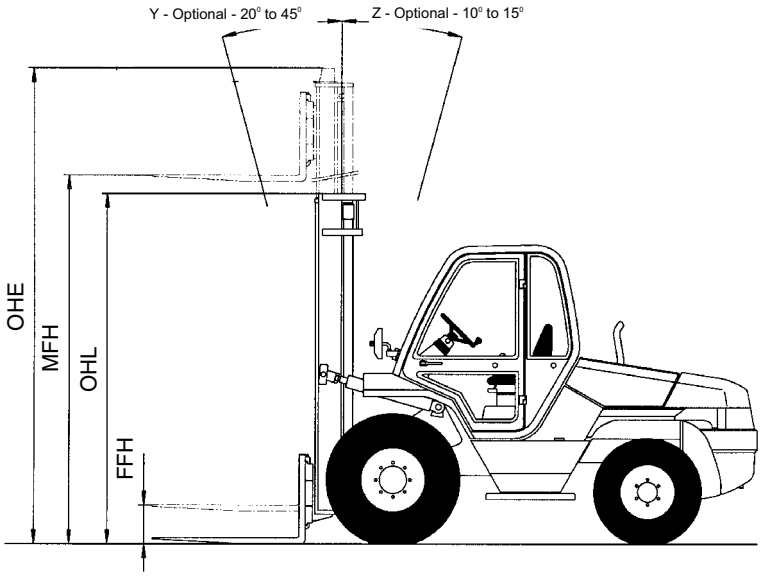
When changing or replacing the tires and wheels; use only the manufacturer's approved components as installed at the factory. Any substitutes or modifications must first be approved by the manufacturer.

MAST CHARACTERISTICS TABLE

SOME DIMENSIONS MAY VARY DEPENDING ON CARRIAGE OR ACCESSORIES SUPPLIED
- DIMENSIONS SHOWN IN INCHES -

M30						
2-STAGE MAST						
MAST	FFH	MFH	OHL	OHE	Z	Y
805323-04	8”	89”	81”		varies	varies
805323-05	8”	127”	100”		varies	varies
805323-06	8”	163”	118”		varies	varies

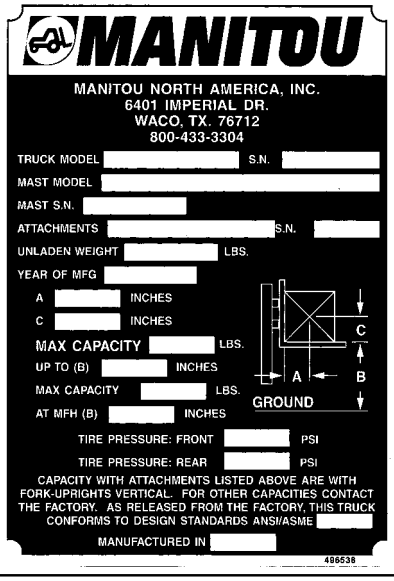
M30						
3-STAGE “TOTAL VISIBILITY” ROLLER MAST						
MAST	FFH	MFH	OHL	OHE	Z	Y
805069-02	16”	129.5”	75”		varies	varies
805069-03	16”	135.5”	77”		varies	varies
805069-04	16”	147.5”	81”			



OHE - OVERALL HEIGHT WITH MAST FULLY EXTENDED
MFH - MAXIMUM FORK HEIGHT WITH MAST FULLY EXTENDED
OHL - OVERALL MAST HEIGHT WITH FORKS FULLY LOWERED
FFH - FREE FORK HEIGHT; FORK HEIGHT BEFORE RAISING MAST RAILS

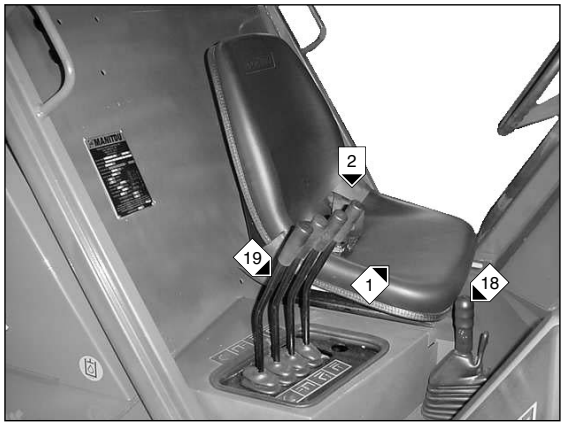
LIFT TRUCK LOAD CHART

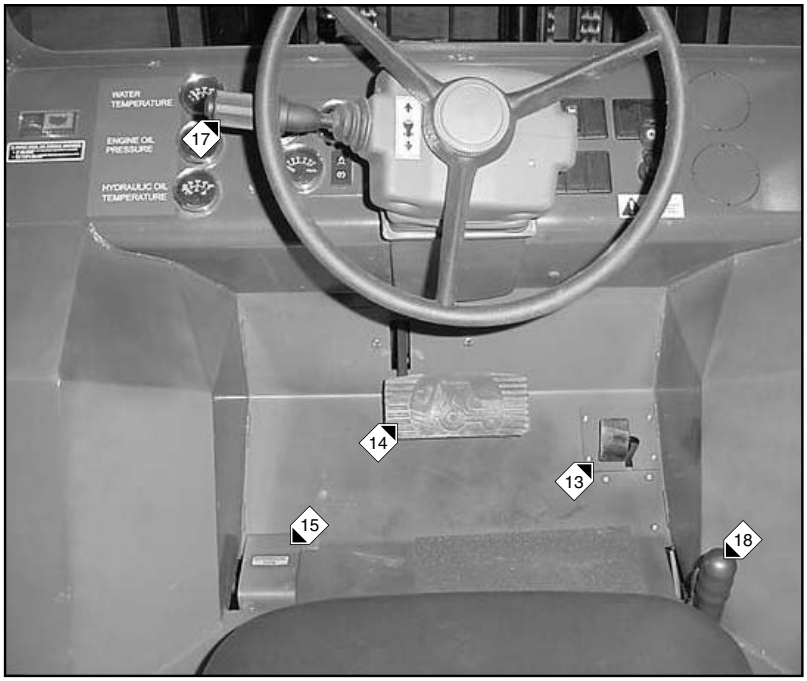
Refer to the Lift Truck Identification Plate (attached within the cab) for maximum (load) capacities.

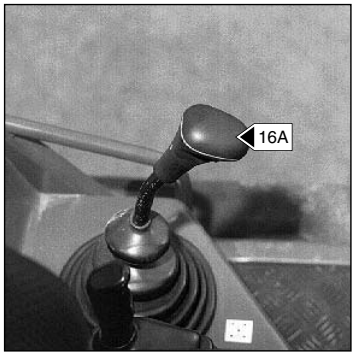


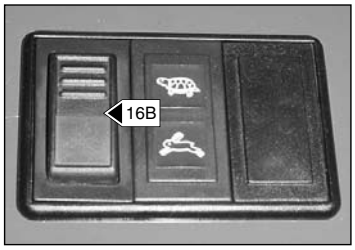
INSTRUMENTS AND CONTROLS

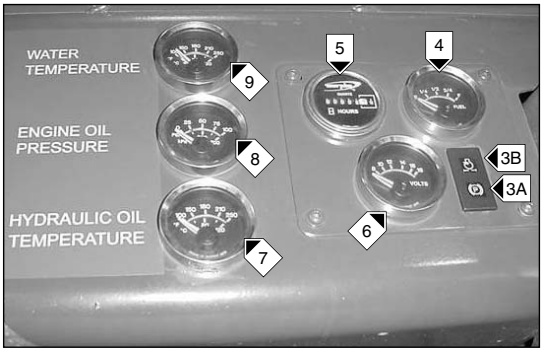
USE THE PHOTOS BELOW FOR COMPONENT IDENTIFICATION AND LOCATION ONLY.
(INSTRUMENTS, CONTROLS AND OPTIONS SHOWN VARY, AND MAY NOT BE INCLUDED ON YOUR FORKLIFT MODEL.)

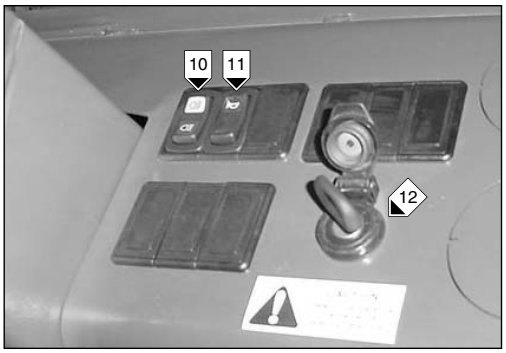












DESCRIPTION

1 - DRIVER'S SEAT
2 - SAFETY BELT
3A - PARK BRAKE “ON” INDICATOR
3B - AIR FILTER “NEEDS SERVICE” INDICATOR
4 - FUEL LEVEL METER
5 - HOURMETER
6 - ALTERNATOR VOLTAGE METER
7 - HYDRAULIC OIL TEMPERATURE METER
8 - ENGINE OIL PRESSURE METER
9 - ENGINE WATER TEMPERATURE METER
10 - LIGHT SWITCH
11 - HORN SWITCH
12 - IGNITION SWITCH
13 - ACCELERATOR PEDAL
14 - SERVICE BRAKE PEDAL AND TRANSMISSION CUT-OFF
15 - DIFFERENTIAL LOCK PUSH BUTTON
16A - GEAR LEVER AND TRANS CUT-OFF (4-SPEED TRANSMISSION)
16B - 2-SPEED GEAR BOX SWITCH (HYDROSTATIC OPTION)
17 - FORWARD/REVERSE LEVER
18 - PARKING BRAKE LEVER
19 - HYDRAULIC CONTROLS
20 - DOCUMENT STORAGE
21 - BREAKER SWITCHES

NOTE: The terms LEFT, RIGHT, FRONT, REAR refer to the location of forklift components in relation to the forklift operator, seated normally, facing forward.

1 - DRIVER'S SEAT

DESIGNED FOR COMFORT, THIS SEAT CAN BE ADJUSTED AS FOLLOWS:

LONGITUDINAL ADJUSTMENT
- Push locking lever 1 to the left.
- Slide the seat to the required position.
- Release the lever and insure it returns to the locked position.

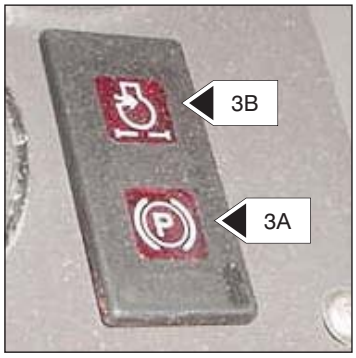
2 - SAFETY BELT

- Sit correctly on the seat.
- Check that the seat belt is not twisted.
- Place the seat belt at hip level and not across the stomach.
- Attach the seat belt and insure that it locks.
- Adjust the seat belt to your body shape without squeezing your hip.

⚠ WARNING

In no event should the lift truck be used if the seat belt is defective (any physical damage, cuts, tears, etc.). If any defects are found, replace the seat belt immediately.

3 - SIGNAL LAMPS



3A - RED PARKING BRAKE "ON" LAMP
This lamp comes on when the parking brake is applied.

3B - RED AIR FILTER "NEEDS SERVICE" LAMP
The lamp comes on when the air filter cartridge is clogged. Stop the lift truck and make the necessary repairs (See FILTERS, CARTRIDGES AND BELTS in SECTION 3 - MAINTENANCE).

4 - FUEL LEVEL

Indicates the fuel level in the fuel tank.

5 - HOURMETER

Indicates the number of hours the lift truck has operated. Use the hourmeter for scheduling maintenance.

6 - ALTERNATOR VOLTAGE METER

Indicates voltage output of the alternator while the engine is running. Normal operating voltage is 12 - 14 volts.

7 - HYDRAULIC OIL TEMPERATURE METER

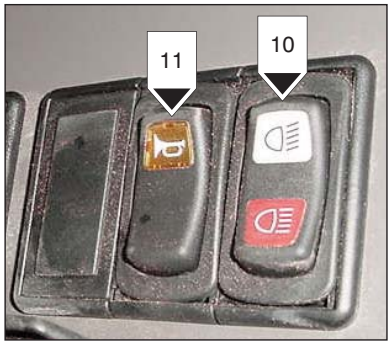
Indicates hydraulic oil temperature. Normal operating temperature is 190 - 205°F (210°F Max.).

8 - ENGINE OIL PRESSURE METER

Indicates engine oil pressure. Normal oil pressure is 40 - 60 psi.

9 - ENGINE WATER TEMPERATURE METER

Indicate engine water temperature. Normal operating temperature is 190 - 215°F (220°F Max.).



10 - LIGHT SWITCH

Three position toggle switch - top selection turns front and rear white lights on, bottom selection turns front and rear red lights on, center position turn all lights off.

11 - HORN SWITCH

Press switch to sound horn.

12 - IGNITION SWITCH

The key switch has five positions :

P - Ignition off, parking position.
O - Ignition switched off and engine stopped.
I - Ignition on.
II - Fuel pre-heating.
III - The engine starts, returns to position I as soon as the key is released.

13 - ACCELERATOR PEDAL

Controls engine speed, speed of hydraulic movements, and travel speed.

14 - SERVICE BRAKE AND TRANSMISSION CUT-OFF PEDAL

The brake pedal acts on the front wheels using hydraulic braking for slowing and stopping the lift truck. On the Hydrostatic Model; the pedal provides progressive transmission cut off, allowing for a gradual approach (delicate handling) at full power. On the 4-Speed Model; the pedal fully disengages the transmission, allowing full power for load handling.

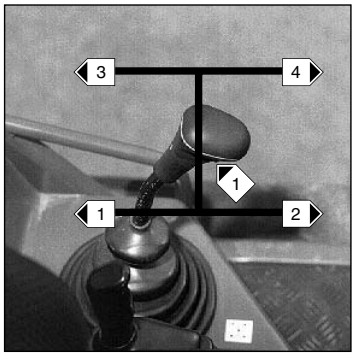
15 - DIFFERENTIAL LOCK PUSH BUTTON OPTION

CAUTION

When engaging the differential lock some loss of steering may occur: shift to 1st gear and steer straight ahead before applying the diff lock.

The differential lock causes both front wheels to turn at the same time, increasing traction on slippery terrain. To engage the differential lock; with your left foot lift the switch cover, then press and hold the foot switch down. Release the switch to disengage the differential lock. Push the switch cover down.

16A - GEAR LEVER AND TRANSMISSION CUT-OFF (4-SPEED TRANSMISSION)



To change speed (gears), it is necessary to disengage the transmission by pressing button 1 (dump valve) on the gear shift lever. Gear selections are as follows:

1st gear: To the right, backwards.
2nd gear: To the right, forwards.
3rd gear: To the left, backwards.
4th gear: To the left, forwards.

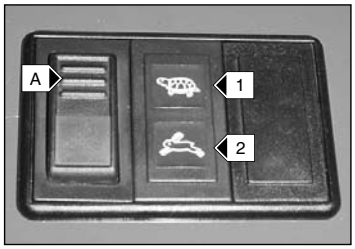
USING THE GEARS ON THE GEARBOX
- On lift trucks with a torque converter it is not always necessary to start in 1st gear and progress up through the gears.

IMPORTANT

The choice of gear ratio should be made according to the work to be performed. A poor choice may over-heat the transmission (through excessive converter slipping), which could lead to serious damage to the transmission. (It is essential to stop and change gears or the working conditions if the transmission oil temperature light comes on).

General examples for transmission gear selection:
• On paved or maintained roadways: Start off in 3rd gear, changing to 4th as conditions permit. On hills, start off in 2nd gear, changing to 3rd and 4th as conditions permit.
• With a trailer on maintained roadway: Start off in 2nd gear, changing to 3rd as conditions permit.
• Load Handling: 3rd gear, 2nd gear in restricted spaces.
• Heavy handling: 1st gear.
• Loading: 2nd gear.

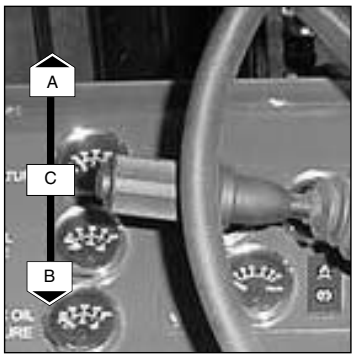
16B - 2-SPEED GEAR BOX SWITCH (HYDROSTATIC OPTION)



To change gears: Bring the lift truck to a complete stop, keep the brake pedal fully engaged and switch the forward/reverse lever to neutral. Activate the toggle switch A to change gears. Your selection will illuminate the choosen gear:
(1) low gear: for loading, heavy handling.
(2) high gear: for road use, trailer towing, general handling.

NOTE: The gear box automatically returns to high gear when the engine is stopped.

17 - FORWARD/REVERSE LEVER

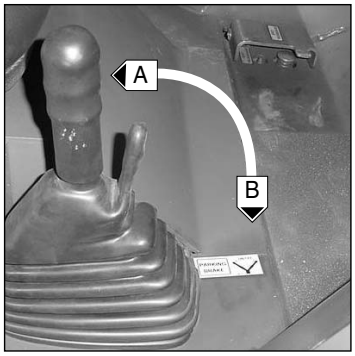


Before operating this control, the lift truck should be stopped or traveling at a very slow speed. When in the neutral position, the shifter sets in a lock or indent, preventing accidental shifting movement.

FORWARD: Lift slightly and push the lever upwards (Position A).
REVERSE: Lift slightly and pull the lever downwards (Position B).
NEUTRAL: To start the lift truck the lever must be in neutral (Position C).

NOTE: The backup alarm must sound when the lift truck is shifted to reverse.

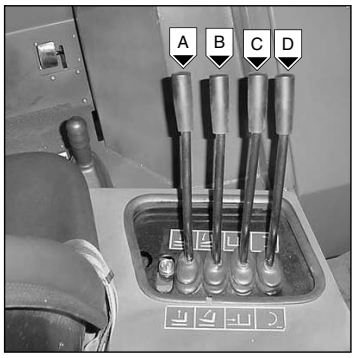
18 - PARKING BRAKE LEVER



To prevent accidental release, the lever is equipped with safety locking.

- To apply the parking brake, pull the lever backwards (Position A).
- To disengage the parking brake, release and push the lever forwards (Position B).

19 - HYDRAULIC CONTROLS



WARNING	*Do not attempt to alter the hydraulic system pressure by interfering with the pressure regulating valve. In the event of suspected malfunction, contact your dealer.*

LEVER A: Controls load lifting.
- Move the lever back for load lifting.
- Move the lever forward for load lowering.

LEVER B: Controls mast tilting.
- Move the lever back to tilt the mast backward.
- Move the lever forward to tilt the mast forward.

LEVER C: Controls mast side-shift.
- Move the lever back to shift the mast to the right.
- Move the lever forward to shift the mast to the left.

LEVER D: Controls optional attachment

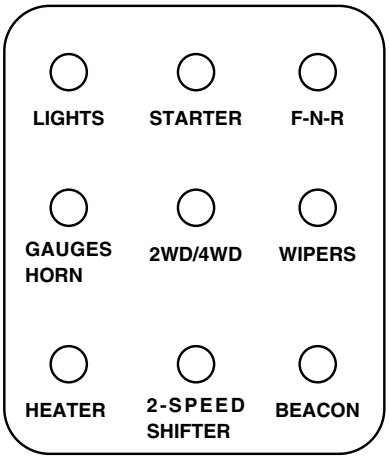
20 - DOCUMENT STORAGE

Store the operator's manual in the document box on the lift truck. Keep it available at all times.

21 - BREAKERS

Breakers are installed depending on forklift truck model and options provided.

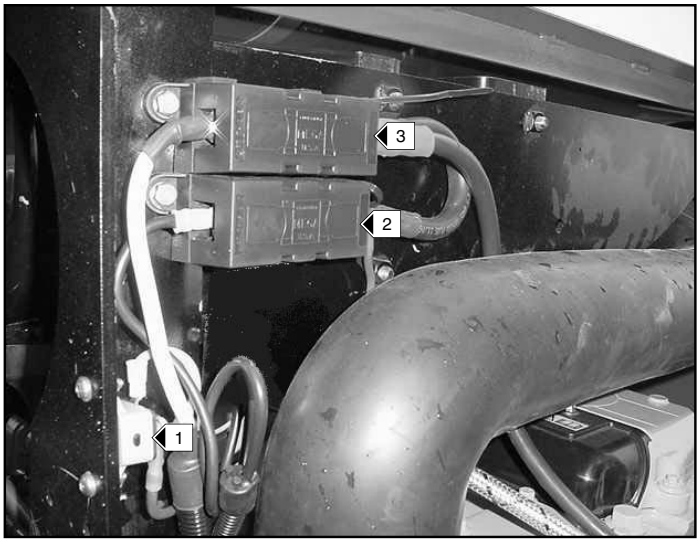
BREAKER SWITCH
IDENTIFICATION
(DECAL)

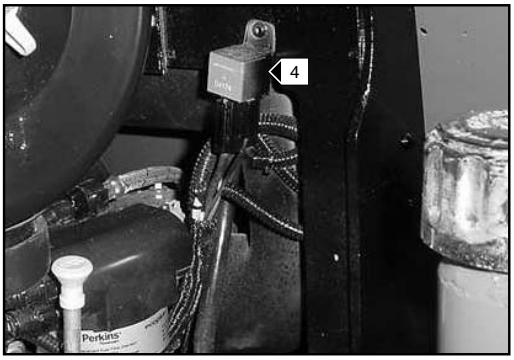


26C - PRIMARY BREAKER AND FUSES

Located under the hood, on the right side of the forklift, mounted on the front side of the hood support bracket. (Photo taken with cab in raised position.)

- Breaker Panel Fuse w/ reset (40A) Item 1.
- Engine Pre-heat Fuse (80A) Item 2.
- Alternator Fuse (80A) Item 3.
- Engine Pre-heat Relay Item 4. (Located behind air cleaner)





TOWING PIN

The towing capacity is rated for each model of lift truck (tractive effort and maximum vertical force at the coupling point). See IDENTIFICATION OF THE LIFT TRUCK in SECTION 2 - DESCRIPTION.

- Refer to local regulations for towing on public roadways (maximum running speed, braking requirments, maximum weight of trailer, etc.).
- Always check the trailer's condition before towing it (tires, electrical connections, hydraulic hoses, braking system, etc.).

WARNING	***Do not tow a trailer or accessory which is not in proper working order. Pulling a trailer in poor condition may effect the lift truck's steering, braking, and safe operation.***

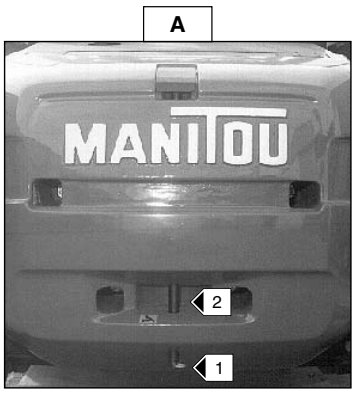
WARNING	***If a third party helps in coupling or uncoupling the trailer, they must be constantly visible to the driver and must wait until the lift truck has parked, (the parkbrake is on and the engine is switched off) before hooking or unhooking the trailer.***

A - TOWING PIN (FIG. A)

COUPLING AND UNCOUPLING THE TRAILER

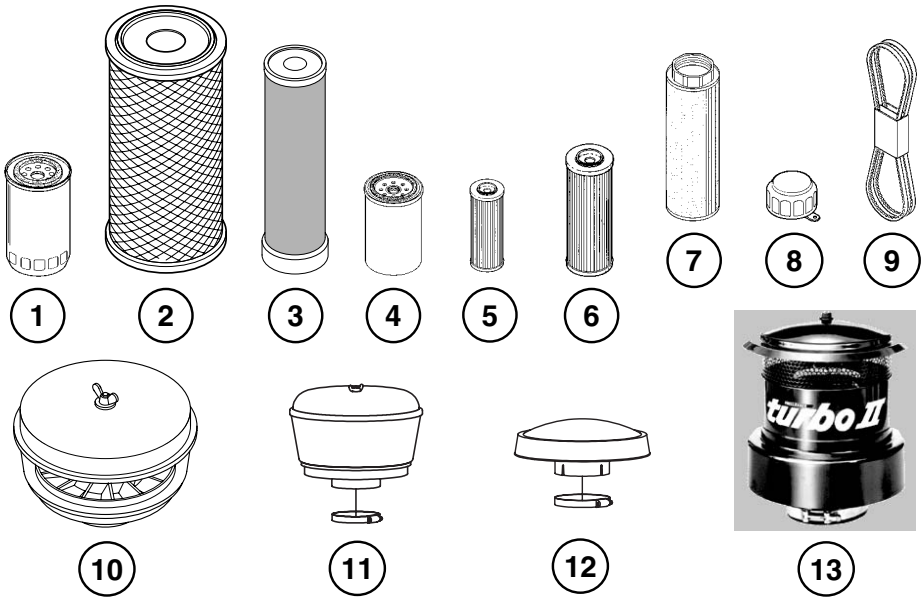
- To couple the trailer, position the lift truck as close as possible to the trailer ring.
- Park the lift truck (engage the parkbrake and turn the engine off).
- Remove the retainer clip 1, lift the trailer pin 2 and insert or remove the trailer ring.

WARNING	***Be careful not to get your fingers caught or crushed during this operation. Do not forget to install the retainer clip 1. When coupling or uncoupling, make sure that the trailer is properly supported (all wheels chocked).***



3 - MAINTENANCE

FILTERS CARTRIDGES AND BELTS



DESIGNATION	PART NUMBER	CLEAN	CHANGE
1 - Engine oil filter (CAT or PERKINS)	476954		500 H
2 - Air filter cartridge (Nelson - steel canister)	803655	50 H *	500 H *
3 - Safety air filter cartridge (Nelson - steel canister)	803654		1000 H *
4 - Transmission oil filter (4-Speed Transmission)	561749		500 H
5 - Fuel filter cartridge (CAT or PERKINS)	605013	500 H	
6A - Hydraulic return oil filter cartridge (4-Speed Transmission)	221174		500 H
6B - Hydraulic return oil filter cartridge (Hydrostatic Transmission)	602096		1000 H
7 - Suction strainer for hydraulic oil tank	424764	1000 H	
8 - Filter cap for hydraulic oil tank	425501		1000 H
9 - Fan belt	702494		
10 - Cyclonic vacuum-cleaning pre-filter (cap and clamp)	224713		
11 - Air intake pre-filter (cap only) Clamp	803071 B2236-15		
12 - Rain cap pre-filter (cap and clamp) Clamp	508565 470680		
13 - Turbo II pre-filter (cap and clamp)	496998	10 H	

* Servicing varies depending on operating conditions (see SERVICING SCHEDULE).

LUBRICANTS AND FUEL

ENGINE

COMPONENT	CAPACITY	RECOMMENDATION		
ENGINE CRANKCASE	8.5 - 9 qts	Shell: Rotella 15w40 Citgo: C-600 15w40	SEE ENGINE OIL SPECS BELOW	
COOLING CIRCUIT	5 gal	Tulco 50/50 Premix Anti-freeze		
FUEL TANK	26 gal	Diesel fuel Grade 1-D		

TRANSMISSION

COMPONENT	CAPACITY	RECOMMENDATION		
TRANSMISSION (4-SPEED MODELS)	4 gal	Shell: Donax TG Dexron III Citgo: Transgard ATF Dexron III		
GEARBOX (HYDROSTATIC MODELS)	2.4 qts	Shell: Spirax DH80w90 Citgo: Premium Gear MP 80w90		
TRANSMISSION UNIVERSAL JOINT		Shell: Rentinax Am Citgo: Lithoplex CM-2		

MAST

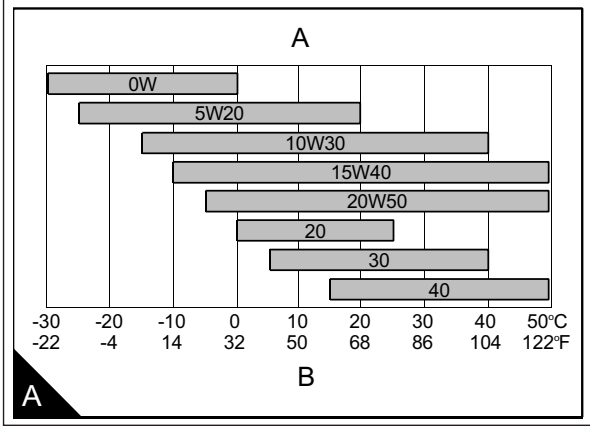
COMPONENT	RECOMMENDATION		
MAST LIFTING CHAINS	Engine oil		
GREASING THE MAST	Shell: Rentinax Am Citgo: Lithoplex CM-2		

HYDRAULICS

COMPONENT	CAPACITY	RECOMMENDATION		
HYDRAULIC OIL TANK	26 gal	Shell: Tellus T46 Citgo: Transgard THF Lo-Temp		

BRAKE

COMPONENT	RECOMMENDATION		
BRAKE CIRCUIT	Shell: Donax TG Dexron III Citgo: Transgard ATF Dexron III		



ENGINE OIL SPECIFICATIONS

API CG4 / CH4

ACEA E3 / ES

Caution: The above oils are to the minimum specification recommended. Higher grades may be used but not until after the first service, nor for light load applications.

FRONT AXLE

COMPONENT	CAPACITY	RECOMMENDATION		
FRONT AXLE DIFFERENTIAL	1.8 gal	Shell: Donax TD Citgo: Transgard Tractor Hyd Fluid		
FRONT WHEELS REDUCERS	0.8 qts	Shell: Spirax DH80w90 Citgo: Premium Gear MP 80w90		

REAR AXLE - 2WD

COMPONENT	RECOMMENDATION		
ALL GREASE FITTINGS	Shell: Rentinax Am Citgo: Lithoplex CM-2		

REAR AXLE - 4WD

COMPONENT	CAPACITY	RECOMMENDATION		
REAR AXLE DIFFERENTIAL	1.8 gal	Shell: Donax TD Citgo: Transgard Tractor Hyd Fluid		
REAR WHEELS REDUCERS	0.8 qts	Shell: Spirax DH80w90 Citgo: Premium Gear MP 80w90		
REAR WHEELS REDUCER PIVOTS REAR AXLE OSCILLATION		Shell: Rentinax Am Citgo: Lithoplex CM-2		

DIAGNOSTIC ANALYSIS OF OIL

In the event of a maintenance or service contract with the dealer, you may be requested to provide a sample of a selected component's oil, for diagnostic analysis.

SERVICING SCHEDULE

A = AJUST	N = CLEAN
C = CHECK	P = BLEED
D = DESCALE	R = CHANGE
G = GREASE	V = DRAIN/CHANGE

	After the first 50 hours	Day or 10 hours	50 hours	250 hours	1 year or 500 hours	1 year or 1000 hours	2000 hours	4000 hours
ENGINE								
Engine oil level		C						
Cooling liquid level		C						
Fuel level		C						
Cyclonic prefilter (OPTION)		N						
Dry air filter cartridge			N		R			
Radiator core			N					
Fuel filter			C					
Alternator/fan/crankshaft belt tension	A			A				
Engine oil	V				V			
Engine oil filter	R				R			
Fuel filter cartridge	R				R			
Fuel feed pump					N			
Engine crankcase breather					N/R			
Fuel tank						N		
Safety dry air filter cartridge						R		
Engine silent blocks						C**		
Engine rates						C**		
Valves clearances	C**					C**		
Cooling liquid							V	
Radiator							N/D**	
Water pump and the thermostat							C**	
Alternator and the starter motor							C**	
Bleed the fuel system	SEE - G - OCCASIONAL MAINTENANCE -							
TRANSMISSION/HYDROSTATIC PUMP/MOTOR								
Transmission oil level		C						
Transmission oil filter	R				R			
Transmission oil	V					V		
Transmission housing strainer						N		
Transmission controls						C**		
Transmission/hydrostatic pump pressures							C**	
Hydrostatic motor pressures							C**	
Converter pressure							C**	
TIRES								
Tires pressure		C						
Wheel nuts torque		C						
Condition of wheels and tires						C**		
Change a wheel	SEE - G - OCCASIONAL MAINTENANCE -							
MAST								
Tension and alignment of the mast lifting chains			C/R					
Mast			G					
Mast guide rollers			G					
Mast uprights				G*				
Mast lifting chains					G		G/C**	
Condition of mast unit							C**	
Mast guide rollers							C**	
Mast bearing rollers							C**	
HYDRAULICS								
Hydraulic oil level			C					
Hydraulic return oil filter cartridge	R				R			
Hydraulic oil						V		
Suction strainer for hydraulic oil tank						N		
Filter cap for hydraulic oil tank						R		
Speeds of hydraulic movements						C**		
Condition of hoses						C**		
Condition of cylinders (leakage, shafts)						C**		
Hydraulic circuit pressures							C**	
Hydraulic circuit outputs							C**	
Hydraulic oil tank							N**	
BRAKE								
Brake oil level			C					
Parking brake				A				
Parking brake mechanism					G			
Brake oil						V**		
Brake circuit						P**		
Brake circuit pressure						C**		
Brake						A**		

A = AJUST	N = CLEAN
C = CHECK	P = BLEED
D = DESCALE	R = CHANGE
G = GREASE	V = DRAIN/CHANGE

	After the first 50 hours	Day or 10 hours	50 hours	250 hours	1 year or 500 hours	1 year or 1000 hours	2000 hours	4000 hours
CAB								
Seat belt						C		
Structure						C**		
Lift the cab				SEE - G - OCCASIONAL MAINTENANCE -				
ELECTRICITY								
Battery electrolyte level			C					
Battery electrolyte density					C			
Condition of wiring harness and cables						C**		
Lights and signals						C**		
Warning indicators						C**		
FRONT AXLE								
Transmission universal joint			G					G/C**
Front axle differential oil level				C				
Front wheels reducers oil level				C				
Front axle differential oil	V				V			
Front wheels reducers oil	V					V		
Wearing of front axle brake discs							C**	
Front wheels reducers clearance								C**
REAR AXLE (2WD)								
Swivel pins			G					G/C**
Steering knuckle joints			G					
Rear axle oscillation			G				G/C**	
Direction							C**	
Rear axle								C**
REAR AXLE (4WD)								
Transmission universal joint	G				G/C**			
Rear wheels reducers pivots			G					G/C**
Rear axle oscillation			G				G/C**	
Rear axle differential oil level				C				
Rear wheels reducers oil level				C				
Rear axle differential oil	V					V		
Rear wheels reducers oil	V					V		
Steering							C**	
Rear wheels reducers universal joint								C**
Steering swivel joints								C**
Rear wheels reducers clearance								C**
GEARBOX (HYDROSTATIC TRUCKS ONLY)								
Gearbox oil level				C				
Gearbox oil	V					V		
CHASSIS								
Structure						C**		
ATTACHMENTS								
Forks wear					C**			
Attachment carriage						C**		
Condition of attachments						C**		

(*) : To be done before starting up the new lift truck and a last time after 250 hours service.
(**) : Consult your dealer.

A - DAILY OR EVERY 10 HOURS SERVICE

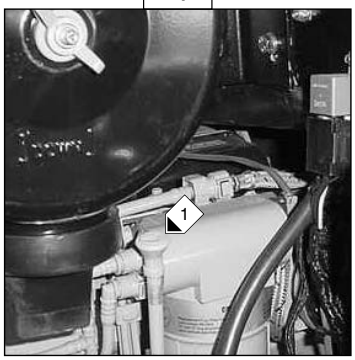
A1 - ENGINE OIL LEVEL

CHECK

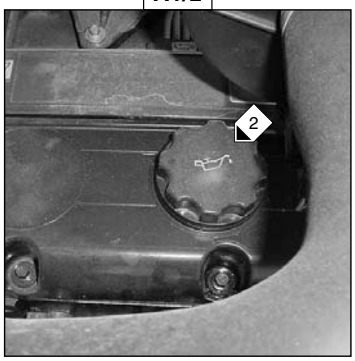
Park the lift truck on level ground with the engine stopped, and allow the oil to settle.

- Open the engine compartment.
- Remove the dipstick 1 (Fig. A1/1).
- Clean the dipstick and check the level between the MAXI and MINI notches.
- If necessary, add oil (See LUBRICANTS AND FUEL) through the valve cover filler port 2 (Fig. A1/2) on top of the Perkins engine (Cat engine filler port on the right side of the engine, near the fuel injection pump - not shown).

A1/1



A1/2



A2 - COOLING LIQUID LEVEL

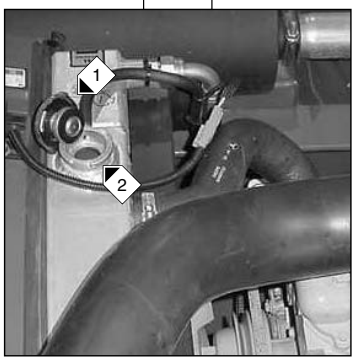
CHECK

CAUTION	*ALLOW THE ENGINE TO COOL BEFORE OPENING THE RADIATOR CAP.*

Park the lift truck on level ground with the engine stopped, allow the engine to cool.

- Open the engine compartment.
- Slowly turn the radiator cap 1 (Fig. A2) counterclockwise to the safety stop.
- Allow any pressure and vapor to escape.
- Press down and continue to turn the cap to release it.
- If necessary, add cooling liquid (See LUBRICANTS AND FUEL) until 1/2 inch (12 mm) below the filler port 2 (Fig. A2).
- Lubricate the radiator filler neck lightly to help the radiator cap open easily.

A2



A3 - FUEL LEVEL

CHECK

Keep the fuel tank near full when possible, to reduce condensation.

- Remove cap 1 (Fig. A3).
- Fill the fuel tank with clean fuel (See LUBRICANTS AND FUEL), filtered through a strainer or a clean, lint free cloth.
- Reinstall the cap 1 (Fig. A3).

WARNING	*Never smoke or approach with a flame during filling operations or when the tank is open. Never refill while engine is running.*

IMPORTANT	*The fuel tank is vented through the filler cap. When replacing it, always use an original part, with venting.*

A3

A4 - CYCLONIC PREFILTER (OPTION)

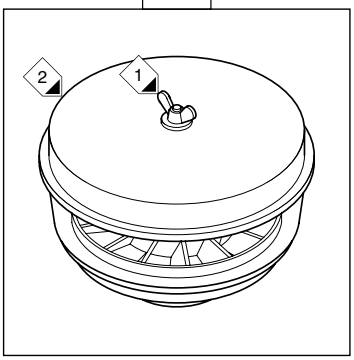
CLEAN

The cleaning interval is given as a guide, however the prefilter must be emptied as soon as impurities reach the MAXI level on the tank.

- Loosen nut 1 (Fig. A4), remove cover 2 (Fig. A4) and empty the tank.
- Clean the prefilter unit with a clean dry cloth and reassemble the unit.

IMPORTANT	***When cleaning, take care not to allow impurities into the dry air filter.***

A4



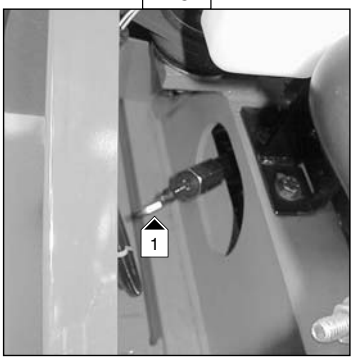
A5 - TRANSMISSION OIL LEVEL (4-SPEED MODELS)

CHECK

Park the lift truck on level ground with the engine cold and at idle.

- Open the engine compartment.
- Remove the dipstick 1 (Fig. A5).
- Check the level at the upper notch.
- If necessary, add oil (See LUBRICANTS AND FUEL).

A5



A6 - TIRE PRESSURE AND WHEEL NUT TORQUE

CHECK

- Check the condition of the tires, watch for cuts, tears, wear, etc.

IMPORTANT	*Check the torque load of the wheel nuts (See fig. A6). Non compliance can damage and rupture the wheel bolts, and cause distortion to the wheels.*

- Check and adjust the tire pressures if necessary (See CHARACTERISTICS, Section 2 - DESCRIPTION).

WARNING	*Ensure the air hose is correctly connected to the tire valve before inflating and keep all persons at a distance during inflation. Follow the recommended tire pressures given.*

A6

WHEEL NUTS TIGHTENING TORQUE	
FRONT TIRES	444 ft/lbs
REAR TIRES	260 ft/lbs

A6

A7 - REMOVABLE RADIATOR (FEATHER) SCREEN

CHECK

- Check the condition of the screen. If dirty, the screen must be removed for cleaning. Use compressed air directed from the radiator side of the screen. Mild detergent may also be used. If the screen becomes cracked or damaged, it must be replaced.

B - EVERY 50 HOURS SERVICE

Carry out the operations described previously as well as the following operations.

B1 - DRY AIR FILTER CARTRIDGE

CHECK - CLEAN

When operating in heavy dust, use pre-filtration cartridges (See FILTERS CARTRIDGES AND BELTS). Also, check and clean the cartridges more frequently.

IMPORTANT	*If the clogging indicator light comes on, check the air filter as quickly as possible (1 hour maximum). The cartridge must not be cleaned more than seven times, after which the cartridge must be changed.*

- For disassembly and reassembly of the cartridge, see D3 - DRY AIR FILTER CARTRIDGE.
- Clean the filter cartridge using a compressed air jet (Max. pressure 43 psi) directed from the top to the bottom and from the inside to the outside, at a minimum distance of 1.5 in. from the cartridge wall.
- Cleaning is completed when no dust remains on the cartridge.

CAUTION	*Use proper eye and face protection when handling compressed air!*

IMPORTANT	*Respect the safety distance of 1.5 inches between the air jet and the cartridge to avoid tearing or making a hole in the cartridge. The cartridge must not be blown anywhere near the air filter box. Never clean the cartridge by tapping it against a hard surface.*

- Clean the cartridge seal surfaces with a clean damp, lint-free cloth, and lightly lubricate with a silicone lubricant.

IMPORTANT	*Do not clean the dry air filter cartridge by washing it in liquid. Do not clean the safety cartridge located inside the filter cartridge, change it for a new one if it is dirty or damaged.*

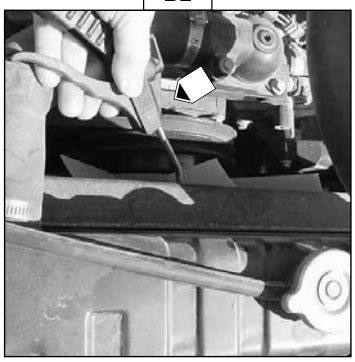
B2 - RADIATOR CORE

CLEAN

- Open the engine compartment.
- Clean the radiator (Fig. B2) with compressed air directed from the engine side to the outside. This is the best way to clean the radiator without damaging the fins.

IMPORTANT	***When handling straw, grain or cereal, clean the radiator core daily. Do not use water jet or high pressure steam as this could damage the radiator fins.***

B2

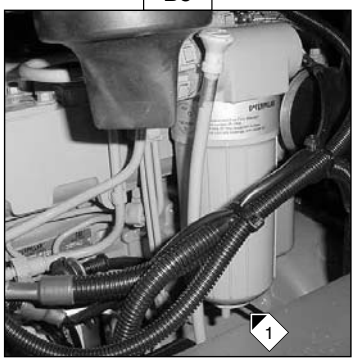


B3 - FUEL FILTER

CHECK

- Open the engine compartment.
- Place a receptacle under the fuel filter and loosen the drain plug 1 (Fig. B3).
- Allow the diesel fuel to flow out until it is free from impurities and water.
- Tighten the drain plug when clean diesel fuel flows out.

B3



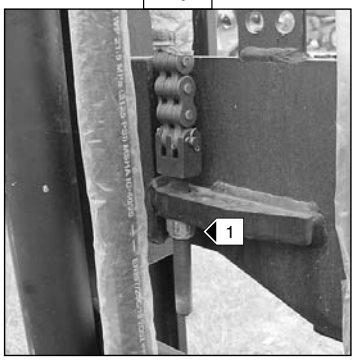
B4 - TENSION AND ALIGNMENT OF THE MAST LIFTING CHAINS

CHECK - ADJUST

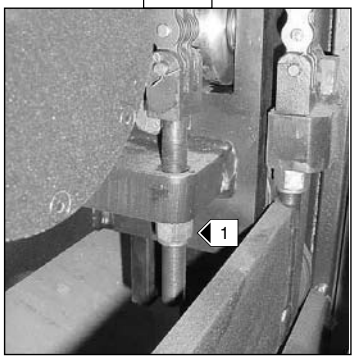
- Park the lift truck on level ground with the mast in a vertical position and the forks lifted to approximately 8 in.
- Check the alignment of the mast lifting chains between the carriage's chain fasteners and the chain rollers (Fig. B4).
- Manually verify the chain tension, if necessary adjust as following, while ensuring that the carriage remains perpendicular to the mast.
- Adjust the tension by tightening or loosening the nut 1 (Fig. B4/1 Commercial Masts, Fig. B4/2 Poultry Masts) while checking the alignment of the lifting chains.

IMPORTANT	*These checks are important for the proper working operation of the mast. In case of technical problems, consult your dealer.*

B4/1



B4/2



B5 - MAST

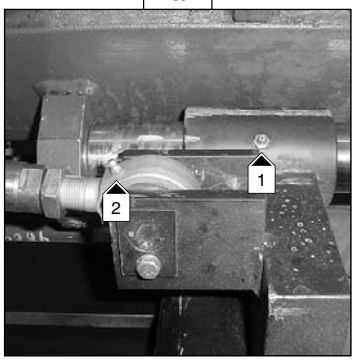
GREASE

Clean and lubricate the following points with grease (See LUBRICANTS AND FUEL), remove any surplus grease.

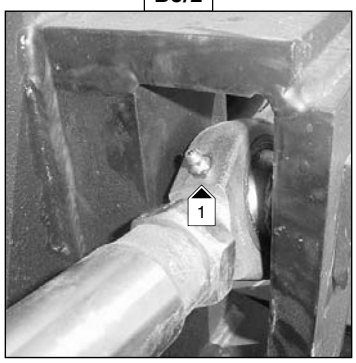
1 - Lubricators (grease zerks) on the side-shift axles of the mast mounting 1 (2 lubricators) (Fig. B5/1).
2 - Lubricator of the side-shift cylinder 2 (1 lubricator) (Fig. B5/1).
3 - Lubricators of the tilt cylinders 1 (2 lubricators) (Fig. B5/2).
4 - Lubricators of the chain rollers 1 (2 lubricators, Poultry masts only) (Fig. B5/3).

NOTE: The mast guide rollers are permanently sealed and require no additional lubrication.

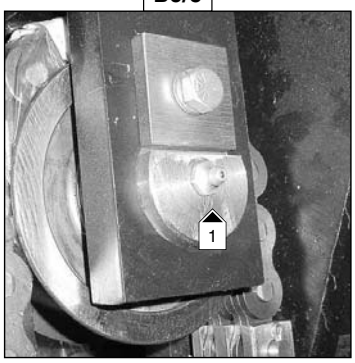
B5/1



B5/2



B5/3



B6 - HYDRAULIC OIL LEVEL

CHECK

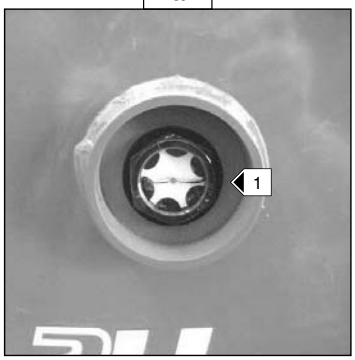
Park the lift truck on level ground with the engine stopped and the forks lowered to the ground.

- On the right-hand side of the forklift find the hydraulic tank oil level gauge 1 (Fig. B6/1).
- The level is correct when the guage is halfway full.
- If necessary, add oil (See LUBRICANTS AND FUEL).
- Open the engine compartment and remove the cap 2 (Fig. B6/2).
- Add oil by filler port 3 (Fig. B6/2).

IMPORTANT	*Clean the oil filler tube before adding fluid. Always use a clean funnel when filling.*

- Always maintain the proper oil level; cooling depends on the oil flowing through the tank at the proper level.
- Reinstall the cap.

B6/1



B6/2

B7 - BRAKE OIL LEVEL

CHECK

Park the lift truck on level ground.

- Remove the front sheet metal plate 1 (Fig. B7/1).
- The level is correct when it is at the MAXI level on the tank.
- If necessary, add oil (See LUBRICANTS AND FUEL) through the filler port 2 (Fig. B7/2).
- Reassemble the front sheet metal plate 1 (Fig. B7/1).

IMPORTANT	*If the braking oil level is abnormally low, consult your dealer.*

B7/1

B7/2

B8 - BATTERY ELECTROLYTE LEVEL (WHERE APPLICABLE)

CHECK

The factory installed battery is maintenance free, requiring no service to the electrolyte.

- Open the engine compartment.
- Check the connections to the battery 1 (Fig. B10), remove any corrosion on the terminals.
- Apply petroleum jelly to prevent corrosion.
- Check the battery mounts and over-all condition of the battery for leaks, cracks, etc..

- If the original battery is replaced with a serviceable battery, follow the manufacturer's instructions for maintenance.

B10

CAUTION

Handling and servicing a battery can be dangerous, take the following precautions:
- *Wear protective goggles.*
- *Keep the battery horizontal.*
- *Never smoke or work near an open flame.*
- *Work in a well-ventilated area.*
- *In the event of electrolyte being spilled onto the skin or splashed in the eyes, rinse thoroughly with cold water for 15 minutes and call a doctor.*

B9 - FRONT AXLE, UNIVERSAL JOINT

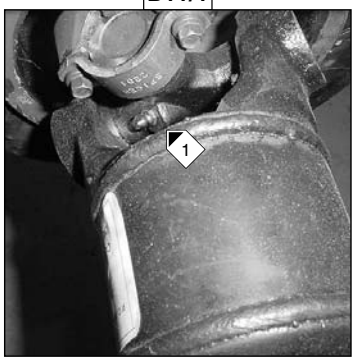
GREASE

Clean and lubricate the following points with grease (See LUBRICANTS AND FUEL), remove surplus grease.

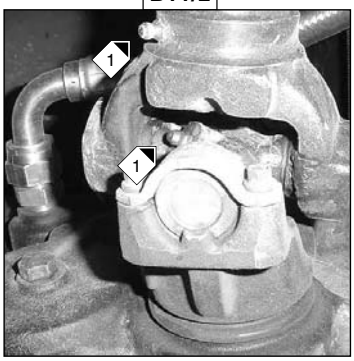
1 - **(4-Speed Transmission Models only)**
Lubricators of the front driveshaft 1 (2 lubricators) (Fig. B11/1 and B11/2).

2 - **(Hydrostatic Transmission Models only)**
Lubricator of the universal joint 1 (1 lubricator) (Fig. B11/3).

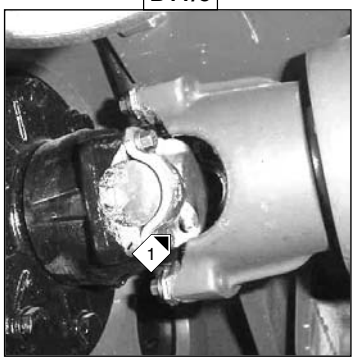
B11/1



B11/2



B11/3



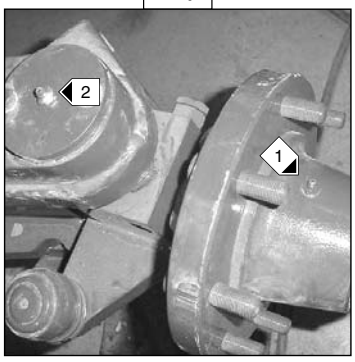
B10 - REAR AXLE, 2WD

GREASE

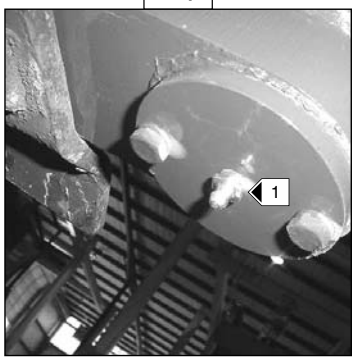
Clean and lubricate the following points with grease (See LUBRICANTS AND FUEL), remove surplus grease.

1 - Lubricator of the wheel bearings 1 (2 lubricators) (Fig. B12/1).
2 - Lubricators of the steering pivot pins (4 lubricators) (Fig. B12/1 Item 2 and Fig. B12/2 Item 1).
3 - Lubricators of the steering axle pivots, located on the front and rear of the steer axle pivot points (2 lubricators) (Fig. B12/3).

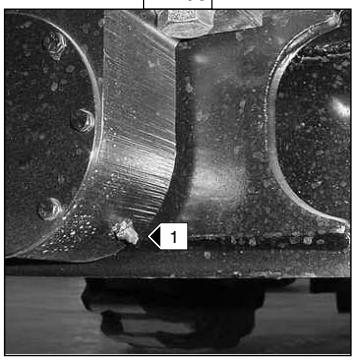
B12/1



B12/2



B12/3



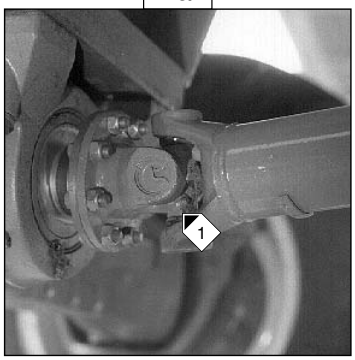
B11 - REAR AXLE, 4WD

GREASE

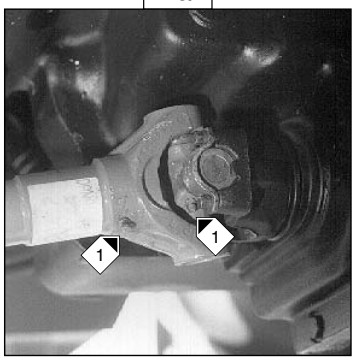
Clean and lubricate the following points with grease (See LUBRICANTS AND FUEL) remove surplus grease.

1 - Lubricators of the rear driveshaft (3 lubricators) (Fig. B13/1 and B13/2).
2 - Lubricators of the rear wheels reducers pivots (4 lubricators) (Fig. B13/3).
3 - Lubricators of the rear axle pivot (2 lubricators) (Fig. B13/4).

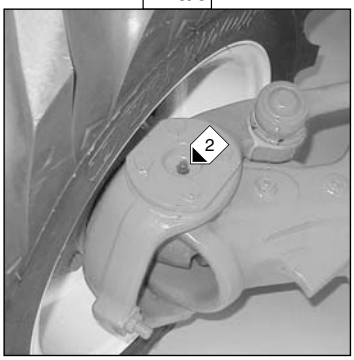
B13/1



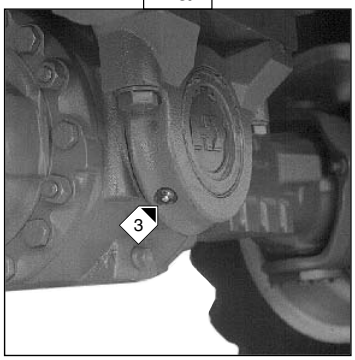
B13/2



B13/3



B13/4

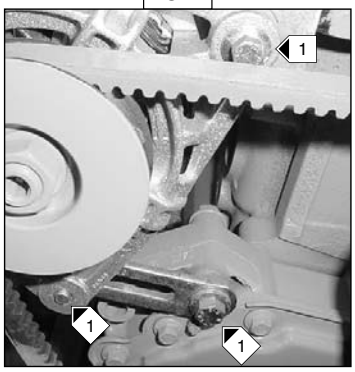


C - EVERY 250 HOURS SERVICE

Carry out the operations described previously as well as the following operations.

C1 - ALTERNATOR BELT TENSION

CHECK - ADJUST

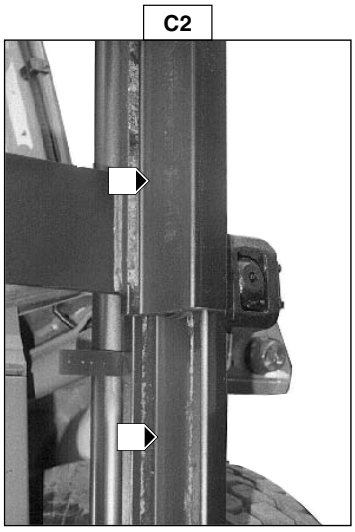


Park the lift truck on level ground.
- Open the engine compartment.
- Check the belt for signs of wear and cracks, change if necessary (See FILTERS CARTRIDGES AND BELTS).
- Check the belt tension midway between the crankshaft pulley and alternator.
- Using pressure exerted with the thumb, the measureable play should be approximately 3/8 in.
- Make adjustments if necessary.
- Loosen screws 1 (Fig. C1) by two to three turns.
- Swivel the alternator assembly to obtain the belt tension required.
- Retighten screws 1 (Fig. C1).

IMPORTANT	*If the alternator belt has to be changed, check the tension again after the first 20 hours of operation.*

C2 - MAST UPRIGHTS

CLEAN / GREASE



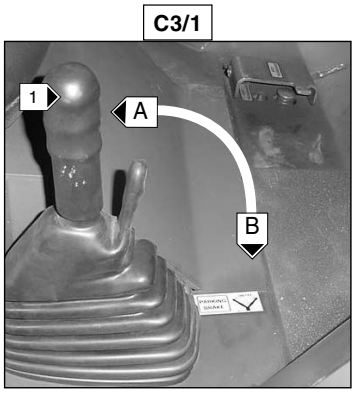
TO BE PERFORMED BEFORE OPERATING A NEW LIFT TRUCK AND ONCE AT 250 HOURS SERVICE.

- Clean and remove the grease from the length of the mast uprights (Fig. C2)
- Check the rollers for wear and replace if necessary.
- Lubricate very lightly with grease (See LUBRICANTS AND FUEL) the entire length of the mast uprights.

IMPORTANT	*In case of technical problems, consult your dealer.*

C3 - PARKING BRAKE

CHECK - ADJUST



- Park the lift truck on a slope of less than 15% grade, with the rated load in the transport position, facing uphill.
- Lock the parking brake in position A (Fig. C3/1).
- The park brake adjustment is correct when the lift truck is held stationary on the slope.
- Make adjustments if necessary.

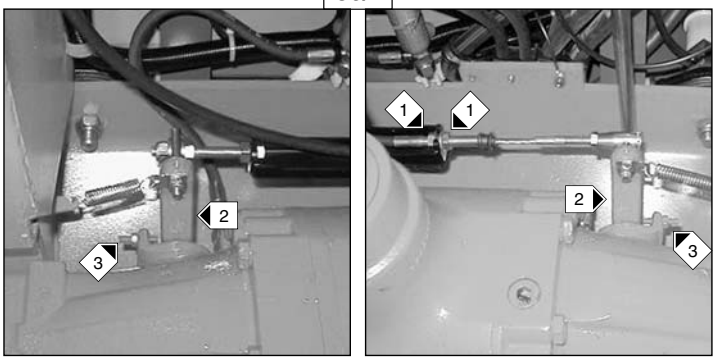
PARKING BRAKE ADJUSTMENT

- Park the lift truck on level ground, stop the engine and chock the wheels.
- Release the parking brake to position B (Fig. C3/1).
- Progressively tighten clockwise the end of lever 1 (Fig. C3/1) and recheck braking, as described above.
- Repeat the operation until the correct braking adjustment is obtained.

ADJUSTMENT OF THE PARKING BRAKE CABLE

- Park the lift truck on level ground, chock the wheels.
- Press and release the brake pedal, then release the parking brake, placing it in position B (Fig. C3/1).
- Loosen nuts 1 (Fig. C3/2).
- Tighten the cable by adjusting nuts 1 (Fig. C3/2), until a clearance of 0.06 in. (1.5 mm) between cams 2 (Fig. C3/2) and stops 3 (Fig. C3/2) is obtained.

C3/2



WARNING *Do not adjust the factory set cam stops. If the park brake will not adjust properly, consult your dealer.*

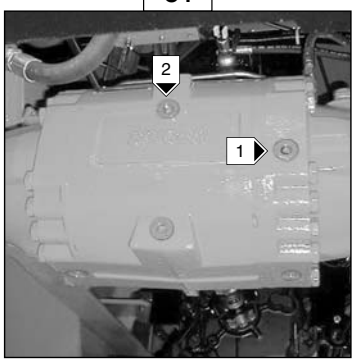
C4 - FRONT AXLE DIFFERENTIAL OIL LEVEL

CHECK

Park the lift truck on level ground with the engine stopped.

- Remove level plug 1 (Fig. C4). The oil should be flush with the edge of the hole.
- If necessary, add oil (See LUBRICANTS AND FUEL) through the filler port 2 (Fig. C4).
- Replace and tighten the plugs (Tightening torque 30 ft/lbs).

C4



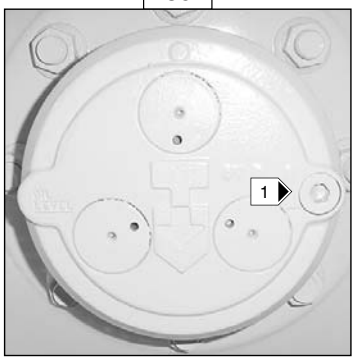
C5 - FRONT WHEELS REDUCERS OIL LEVEL

CHECK

Park the lift truck on level ground with the engine stopped.

- Check the level on each front wheel reducer.
- Place level plug 1 (Fig. C5) in the horizontal position.
- Remove the level plug; the oil should be flush with the edge of the hole.
- If necessary, add oil (See LUBRICANTS AND FUEL) by the same hole.
- Replace and tighten the level plug 1 (Fig. C5) (Tightening torque 30 ft/lbs).

C5



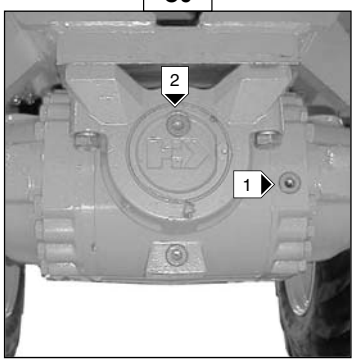
C6 - REAR AXLE DIFFERENTIAL OIL LEVEL (4WD MODELS)

CHECK

Park the lift truck on level ground with the engine stopped.

- Remove level plug 1 (Fig. C6). The oil should be flush with the edge of the hole.
- If necessary, add oil (See LUBRICANTS AND FUEL) by the filler port 2 (Fig. C6).
- Replace and tighten the level plug 1 (Fig. C6) (Tightening torque 30 ft/lbs).

C6



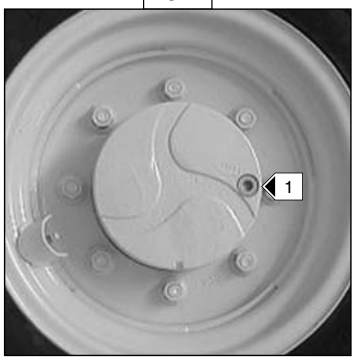
C7 - REAR WHEELS REDUCERS OIL LEVEL (4WD MODELS)

CHECK

Park the lift truck on level ground with the engine stopped.

- Check the level on each rear wheel reducer.
- Place level plug 1 (Fig. C7) in the horizontal position.
- Remove the level plug; the oil should be flush with the edge of the hole.
- If necessary, add oil (See LUBRICANTS AND FUEL) by the same hole.
- Replace and tighten the level plug to 30 ft/lbs.

C7



D - EVERY 500 HOURS SERVICE

Carry out the operations described previously as well as the following operations.

D1 - ENGINE OIL

DRAIN

D2 - ENGINE OIL FILTER

CHANGE

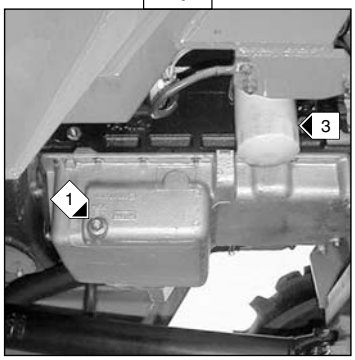
Park the lift truck on level ground, let the engine run at idle for a few minutes to warm the oil, stop the engine.

DRAINING THE OIL

- Open the engine compartment.
- Place a container under the drain plug 1 (Fig. D1/1) and unscrew the plug.
- Remove filler cap 2 (Fig. D1/2) to ensure the oil is drained properly.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

D1/1

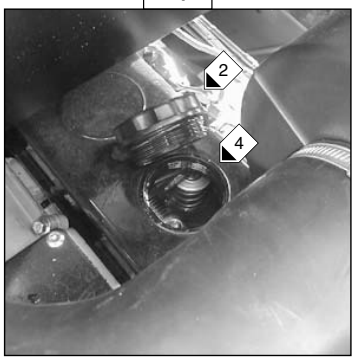


REPLACING THE FILTER

- Remove engine oil filter 3 (Fig. D1/1); discard the filter and the filter seal.
- Clean the filter bracket with a clean, lint-free cloth.
- Fill the new oil filter (See FILTERS CARTRIDGES AND BELTS) with engine oil and lightly grease the seal.
- Install the oil filter on the filter bracket.

IMPORTANT	*Tighten the oil filter by hand pressure only and lock the filter in place by a quarter turn.*

D1/2



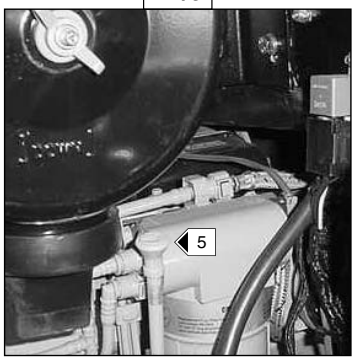
FILLING UP THE OIL

- Install and tighten the drain plug 1 (Fig. D1/1) (Tightening torque 25 ft/lbs).
- Fill with oil (See LUBRICANTS AND FUEL) by filler port 4 (Fig. D1/2) or optional filler port on the right side of the engine, near the fuel injection pump - not shown.

NOTE: For this operation we recommend a funnel and hose.

- Wait a few minutes to allow the oil to settle into the sump.
- Start the engine and let it run for a few minutes.
- Check for possible leaks at the drain plug and the oil filter.
- Stop the engine, wait a few minutes and check that the level is between the MAXI and MINI notches on dipstick 5 (Fig. D1/3).
- Adjust the level if necessary.

D1/3



D3 - DRY AIR FILTER CARTRIDGE

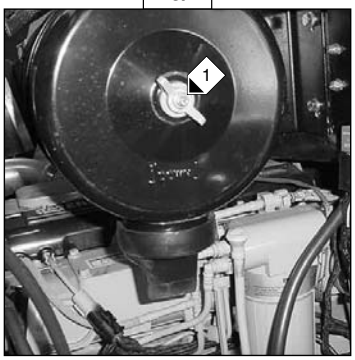
CHANGE

When operating in heavy dust, use pre-filtration cartridges, see FILTERS CARTRIDGES AND BELTS. Also, check and clean the filter cartridges more frequently.

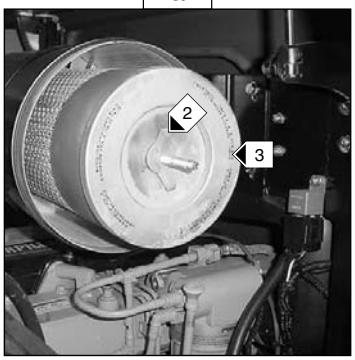
IMPORTANT	*Change the cartridge in a clean location, with the engine stopped. Never run the engine with the air filter removed or damaged.*

- Open the engine compartment.
- Loosen the wingnut 1 and remove the cover 1 (Fig. D3/1).
- Remove the airfilter wingnut 2 (Fig. D3/2) and the airfilter cartridge 3, taking care to avoid spilling the dust.
- Leave the safety cartridge in place.
- The following parts must be cleaned with a damp, clean lint-free cloth.
    - The inside of the filter housing and cover.
    - The inside of the filter inlet hose.
    - The gasket surfaces in the filter and in the cover.
- Check tubing and connections between the air filter and the engine; and the condition of the clogging indicator on the filter housing.
- Before installing, check the condition of the new cartridge (See FILTERS CARTRIDGES AND BELTS).
- Insert the cartridge into the filter housing and push it into place, tighten the wingnut.
- Reassemble the cover, positioning the valve downwards.

D3/1



D3/2

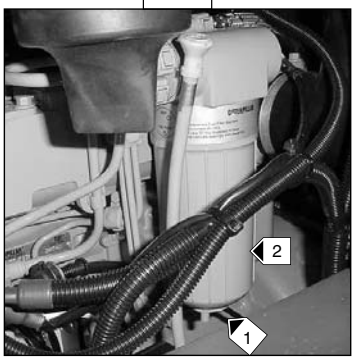


D4 - FUEL FILTER CARTRIDGE

CHANGE

1. - Open the engine compartment.
2. - Carefully clean the exterior of the filter and bracket to prevent debris from entering the system.
3. - Place a receptacle under the tank and empty thru drain plug 1 (Fig. D4).
4. - Unscrew fuel bowl and filter 2 (Fig. D4).
5. - Discard inclosed fuel cartridge (not shown).
6. - Clean the inside of the filter head and the housing, using a brush and clean diesel fuel.
7. - Install new fuel filter into bowl and rotate 90° clockwise (the filter should lock in place). Screw filter/bowl assembly onto filter housing until bowl shoulder contacts filter head, plus 1/4 (90°) turn to tighten.
8. - If necessary, bleed the fuel circuit (See G1 - FUEL SYSTEM BLEEDING).

D4



D5 - TRANSMISSION OIL FILTER (4-SPEED MODELS)

CHANGE

- Remove and discard the transmission oil filter 1 (Fig. D5).
- Carefully clean the filter head with a clean, lint-free cloth.
- Fill the new transmission oil filter with oil (See LUBRICANTS AND FUEL).
- Lightly lubricate the new seal on the filter.
- Install the filter, insuring the seal is correctly positioned.

IMPORTANT	*Tighten the transmission oil filter by hand pressure only, lock the filter in place by a quarter turn.*

D5

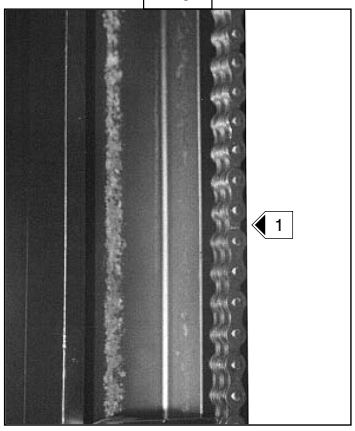
D6 - MAST LIFTING CHAINS

CLEAN - CHECK - GREASE

- Vigorously clean the chains 1 (Fig. D6) with a hard nylon brush and clean diesel fuel.
- Rinse the chains with a soft brush and clean diesel fuel; dry with compressed air.
- Wipe the chains with a clean, lint-free cloth, then examine them closely for any signs of wear.
- Using a soft brush, moderately lubricate the chains with engine oil (See LUBRICANTS AND FUEL).
- Remove all excess oil with a clean cloth.

IMPORTANT	*In case of technical problems, consult your dealer.*

D6



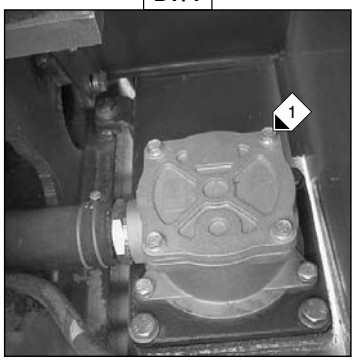
D7 - HYDRAULIC RETURN OIL FILTER CARTRIDGE

CHANGE

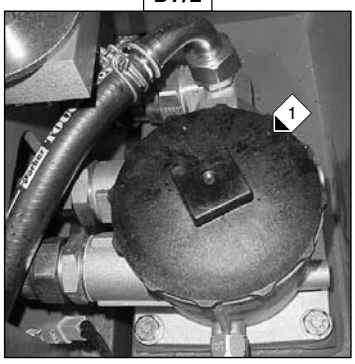
IMPORTANT	*To prevent debris from entering the hydraulic circuit, thoroughly clean the filter housing before opening.*

- Open the engine compartment.
- 4 - Speed Transmission Models: Remove the 4 screws and cover 1 (Fig. D7/1).
- Hydrostatic Transmission Models: Remove the cap 1 (Fig. D7/2).
- Remove the hydraulic return oil filter cartridge and install a new replacement cartridge (See FILTERS CARTRIDGES AND BELTS).
- Install the cover (cap).

D7/1



D7/2

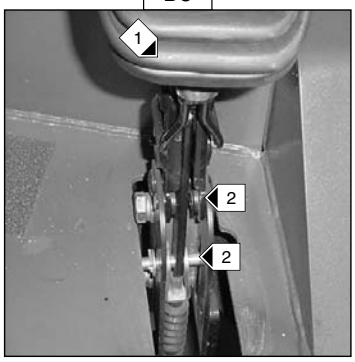


D8 - PARKING BRAKE MECHANISM

GREASE

- Lift the protective boot 1 (Fig. D8).
- Clean and lubricate connections 2 (Fig. D8) with grease (See LUBRICANTS AND FUEL).
- Install the protective boot 1 (Fig. D8)

D8



D9 - FRONT AXLE DIFFERENTIAL OIL

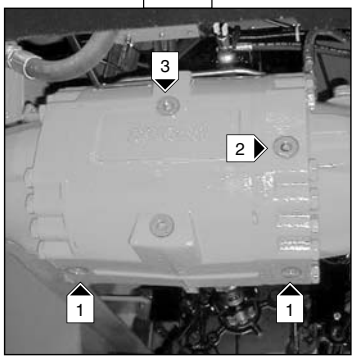
DRAIN

Park the lift truck on level ground with the engine stopped and the differential oil still warm.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

- Place a container under drain plugs 1 (Fig. D9) and remove the plugs.
- Remove level plug 2 (Fig. D11) and filler plug 3 (Fig. D9) to ensure the oil drains properly.
- Install and tighten drain plugs 1 (Fig. D9) (Tightening torque 30 ft/lbs).
- Fill with oil (See LUBRICANTS AND FUEL) by filler port 3 (Fig. D9).
- The level is correct when the oil level is flush with the edge of port 2 (Fig. D9).
- Check for leaks at the drain plugs.
- Install and tighten level plug 2 and filler plug 3 (Fig. D9) (Tightening torque 30 ft/lbs).

D9



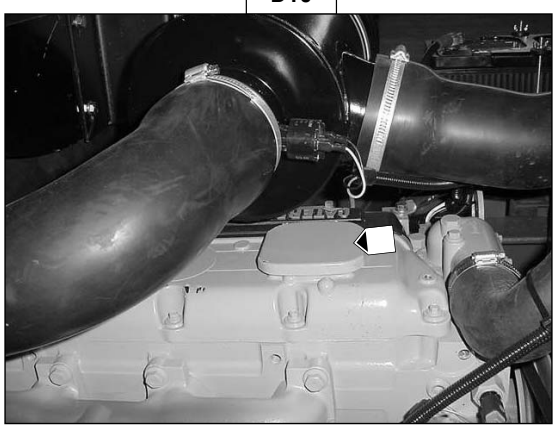
D10 - ENGINE CRANKCASE BREATHER (TIER II)

CLEAN AND INSPECT (REPLACE)

- Open the engine compartment.
- From the left side of the engine locate the breather cover cap (Fig. D10).
- Remove the plastic breather cover cap (pry from front or rear edges).
- Remove the breather cover (4 screws).
- Remove the rubber diaphragm and diaphragm spring.
- Clean and inspect all of the components and the breather cavity.
- Replace the diaphragm and spring if worn or damaged.
- Reinstall the assembly. Make sure the components are installed correctly.

IMPORTANT	*Engine damage may occur if the breather is not working properly.*

D10



E - EVERY 1000 HOURS SERVICE

Carry out the operations described previously as well as the following operations.

E1 - FUEL TANK

CLEAN

WARNING

Do not smoke or work near a flame while performing these tasks .

Park the lift truck on level ground with the engine stopped.
- Inspect the entire fuel system and fuel tank for leaks.
- In the event of a leak, contact your dealer.

WARNING

Never perform welding or any other major repair unless certified; such action could cause an explosion or fire.

- Place a container under drain plug 1 (Fig. E1/1), remove the cap 2 (Fig. E1/2) and the drain plug.
- Allow the fuel to drain, flush the tank with 2 gal. of clean diesel fuel.
- Install and tighten drain plug 1 (Fig. E1/1) (Tightening torque 26 ft/lbs).
- Fill the fuel tank with clean fuel (See LUBRICANTS AND FUEL) filtered through a strainer or a clean, lint-free cloth and install the cap 2 (Fig. E1/2).
- Open the engine compartment.
- Re-prime the fuel system by activating the fuel feed pump - turn the ignition switch on for 3 minutes, then start the engine.
- If necessary, bleed the system (See G1 - FUEL SYSTEM BLEEDING).

E1/1

E1/2

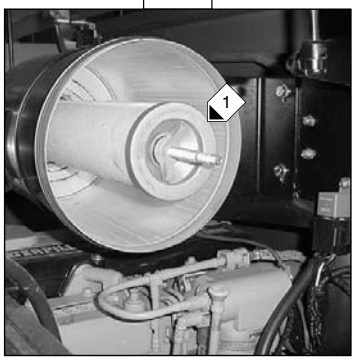
E2 - SAFETY DRY AIR FILTER CARTRIDGE

CHANGE

- For the disassembly and reassembly of the cartridge, see D3 - DRY AIR FILTER CARTRIDGE.
- Gently remove the air filter safety cartridge 1 (Fig. E2), taking care to avoid spilling the dust.
- Clean the gasket surface on the filter with a damp, clean lint-free cloth.
- Before installing, check the condition of the new safety cartridge (See FILTERS CARTRIDGES AND BELTS).
- Carefully push the cartridge into the filter housing, avoid damaging the filter's surface.

NOTE: The time frame for replacement of the safety cartridge is given for reference only. The safety cartridge must be changed for every two changes of the air filter cartridge.

E2



E3 - TRANSMISSION OIL (4-SPEED ONLY)

DRAIN

E4 - TRANSMISSION HOUSING STRAINER (4-SPEED ONLY)

CLEAN

Park the lift truck on level ground with the engine stopped, the transmission oil warm.

DRAINING THE OIL

- Place a container under drain plug 1 (Fig. E3/1) and remove the plug.
- Open the engine compartment.
- Remove the dipstick 2 (Fig. E3/2) and filler plug 3 (Fig. E3/2) to help the oil drain properly.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

CLEANING THE STRAINER

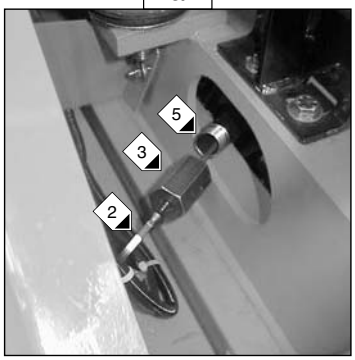
- Remove plate 4 (Fig. E3/3), set aside the O-ring joint and sealing washer.
- Allow the the oil to drain.
- Remove and clean the strainer.
- Clean the magnetic section on the plate.
- Reinstall the assembly and tighten the plate 4 (Fig. E3/3) (Tightening torque 18 ft/lbs).

FILLING UP THE OIL

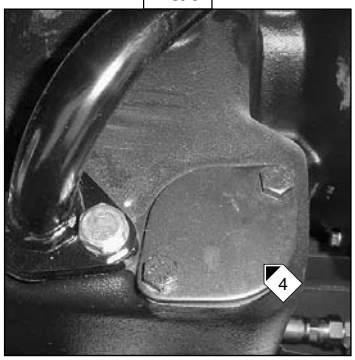
- Refit and tighten drain plug 1 (Fig. E3/1) (Tightening torque 18 ft/lbs).
- Fill with oil (See LUBRICANTS AND FUEL) through filler port 5 (Fig. E3/2),install the filling plug 3 (Fig. E3/2).
- With the engine running at idle, check that the oil level is at the upper notch on dipstick 2 (Fig. E3/2).
- Check for leaks from the drain plug and cover.

E3/1

E3/2



E3/3



E5 - HYDRAULIC OIL

DRAIN

- 4-Speed Models: be prepared to collect over 26 gal. of fluid.
- Hydrostatic Models: be prepared to collect over 26 gal. of fluid.

E6 - SUCTION STRAINER FOR HYDRAULIC OIL TANK

CLEAN

E7 - FILTER CAP FOR HYDRAULIC OIL TANK

CHANGE

FLUSHING THE HYDRAULIC CIRCUIT

- Let the engine run (half throttle) for 5 minutes without hydraulic movements, then for 5 more minutes while using all hydraulic movements (except the steering system).
- Accelerate the engine at full speed for 1 minute, then activate the steering system.
- This operation flushes the hydraulic circuit through the hydraulic return oil filter.

Park the lift truck on level ground with the engine stopped, the mast tilted backwards and lowered as far as possible.

IMPORTANT	*To prevent debris from entering the hydraulic circuit, thoroughly clean the area surrounding the drain plug and the filter housing.*

DRAINING THE OIL

- Place a container under drain plug 1 (Fig. E5/1) and remove the drain plug.
- Open the engine compartment.
- Remove filler cap 2 (Fig. E5/2) to allow the oil to drain properly.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

CLEANING THE STRAINER

- Remove the side panel 3 (Fig. E5/3).
- Disconnect the filter housing hose 4 (Fig. E5/3 4-speed transmission models).
- (On the hydrostatic transmission models; disconnect the 5 filter housing hoses and the electrical connection - not shown).
- Remove the entire hydraulic return oil filter housing 5 (Fig. E5/3).
- From within the tank, remove the strainer. Clean the strainer, check its condition and replace if necessary (See FILTERS CARTRIDGES AND BELTS).
- Install the strainer, a new hydraulic oil filter, and the hydraulic return oil filter housing 5 (Fig. E5/3) (Tightening torque 40 ft/lbs).
- Connect the hose 4 (Fig. E5/3).
- Install the side panel 3 (Fig. E5/3).

FILLING WITH OIL

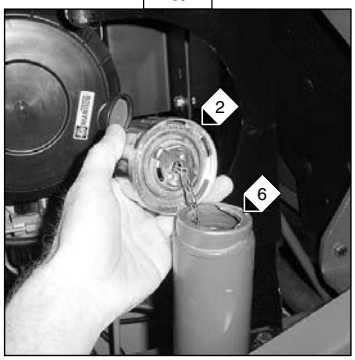
- Clean and install the drain plug 1 (Fig. E5/1) (Tightening torque 26 ft/lbs).
- Fill with oil (See LUBRICANTS AND FUEL) through filler port 6 (Fig. E5/2).

IMPORTANT	*Clean the oil filler port before adding fluid. Always use a clean funnel when filling.*

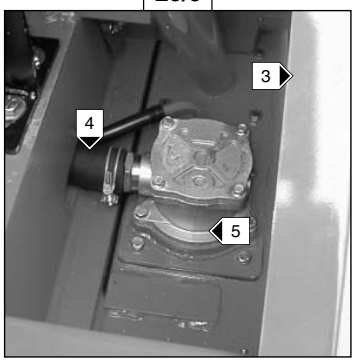
- Check the oil level 7 (Fig. E5/4), it should appear halfway up the guage glass.
- Check the system for leaks.

E5/1

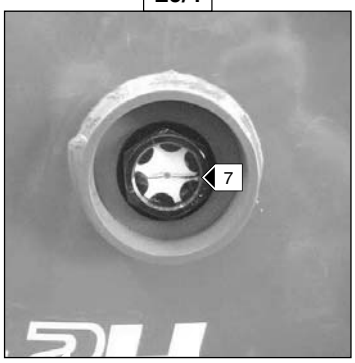
E5/2



E5/3



E5/4



E8 - SEAT BELT

CHECK

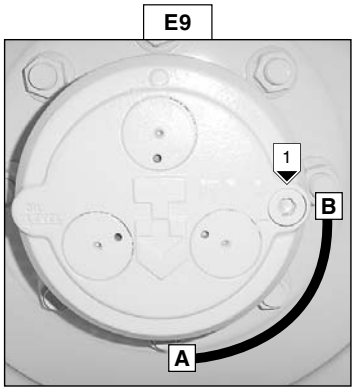
SEAT BELT
- Check the following points:
  - Connection at the anchoring points on the seat.
  - Cleanliness of the strap and the locking mechanism.
  - The locking mechanism operation.
  - Condition of the strap (cuts, frayed or curled edges).

NOTE: If the forklift is involved in an accident, replace the seat belt system immediately.

WARNING
Under no circumstances should you use the lift truck if the seat belt is faulty (catching, locking, cuts or tears, etc). *Repair or replace the seat belt immediately.*

E9 - FRONT WHEELS REDUCERS OIL

DRAIN



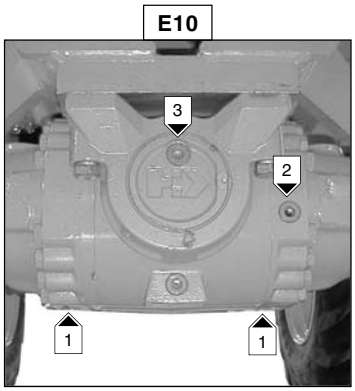
Park the lift truck on level ground with the engine stopped and the reducer oil warm.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

- Drain and change each front wheel reducer's oil.
- Place drain plug 1 (Fig. E9) in position A.
- Place a container under the drain plug and remove the plug.
- Let the oil drain completely.
- Place the drain port in position B, i.e., in a level position.
- Fill with oil (See LUBRICANTS AND FUEL) through level port 1 (Fig. E9).
- The level is correct when the oil level is flush with the edge of the hole.
- Install and tighten the drain plug 1 (Fig. E9) (Tightening torque 30 ft/lbs).

E10 - REAR AXLE DIFFERENTIAL OIL (4WD MODELS)

DRAIN



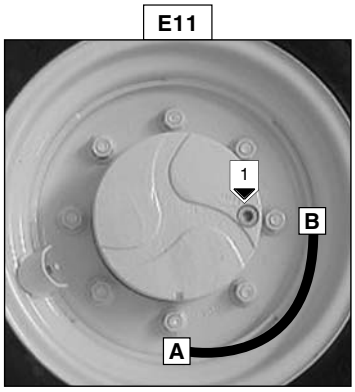
Park the lift truck on level ground with the engine stopped and the differential oil warm.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

- Place a container under the drain plugs 1 (Fig. E10) and remove them.
- Remove level plug 2 (Fig. E10) and filler plug 3 (Fig. E10) to help drain the oil properly.
- Install and tighten the drain plugs 1 (Fig. E10) (Tightening torque 32 ft/lbs).
- Fill with oil (See LUBRICANTS AND FUEL) through filler port 3 (Fig. E10).
- The level is correct when the oil level is flush with the edge of port 2 (Fig. E10).
- Check for leaks at the drain plugs.
- Install and tighten level plug 2 and filler plug 3 (Fig. E10) (Tightening torque 32 ft/lbs).

E11 - REAR WHEELS REDUCERS OIL (4WD MODELS)

DRAIN



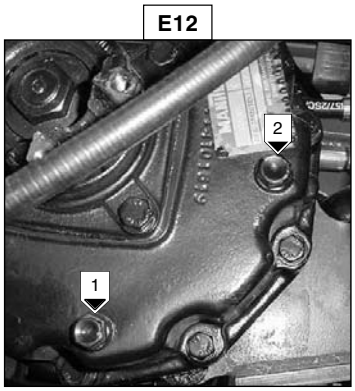
Park the lift truck on level ground with the engine stopped and the reducers oil warm.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

- Drain and change both rear wheel reducers.
- Place drain plug 1 (Fig. E11) in position A.
- Place a container under the drain plug and remove the plug.
- Let the oil drain fully.
- Place the drain port in position B, i.e., in a level position.
- Fill with oil (See LUBRICANTS AND FUEL) through level port 1 (Fig. E11).
- The level is correct when the oil is flush with the edge of the hole.
- Install and tighten the drain plug 1 (Fig. E11) (Tightening torque 32 ft/lbs).

E12 - GEARBOX OIL (HYDROSTATIC MODELS)

DRAIN



Park the lift truck on level ground with the engine stopped and the gearbox oil warm.

IMPORTANT	*Dispose of the drain oil in an ecological manner.*

- Place a container under the drain plug 1 (Fig. E12) and remove it.
- Remove level plug 2 (Fig. E12) to help drain the oil properly.
- Install and tighten the drain plug 1 (Fig. E12) (Tightening torque 32 ft/lbs).
- Fill with oil (See LUBRICANTS AND FUEL) through filler port 2 (Fig. E12).
- The level is correct when the oil level is flush with the edge of port 2 (Fig. E12).
- Check for leaks at the drain plug.
- Install and tighten level plug 2 (Fig. E12) (Tightening torque 32 ft/lbs).

F - EVERY 2000 HOURS SERVICE

Carry out the operations described previously as well as the following operations.

F1 - COOLING LIQUID (ANTIFREEZE)

DRAIN

Perform this service as required or every two years.
- Park the lift truck on level ground with the engine stopped and cold.

DRAINING THE LIQUID

CAUTION	*ALLOW THE ENGINE TO COOL BEFORE OPENING THE RADIATOR CAP.*

- Open the engine compartment.
- Remove the radiator filler cap 1 (Fig. F1/1).
- Place a container below the drain valve 1 (Fig. F1/2).
- Turn the drain valve counterclockwise to open.
- Allow the fluid to drain completely.
- Inspect the radiator hoses and clamps, replace if necessary.
- Flush the circuit with clean water, use a cleaning agent if necessary.

FILLING THE LIQUID
- Close the radiator drain valve.
- Slowly fill the cooling circuit (See LUBRICANTS AND FUEL) to 1/2 in. below the filler port 2 (Fig. F1/1).
- Install the filler cap 1 (Fig. F1/1).
- Run the engine at idle for a few minutes.
- Check for leaks.
- Check the level and refill if necessary.

IMPORTANT

The engine does not contain a corrosion resistor and must be filled with a minimum mixture containing 25% ethylene glycol-based antifreeze.

F1/1

F1/2

G - OCCASIONAL MAINTENANCE

G1 - FUEL SYSTEM BLEEDING

BLEED

Bleeding the fuel system may be required when:
- A component on the fuel system has been replaced or drained.
- The fuel tank has been drained.
- The fuel system has been run dry.

Ensure that the level of fuel in the tank is sufficient and bleed in the following order :
- Open the engine compartment.
- Turn the ignition switch on for three minutes on the lift truck, to give the lift pump time to release air from the filter.
- Turn the ignition switch off.

BLEEDING THE INJECTORS
- Remove the injectors cover 1 (fig. G1/1).
- Loosen high pressure connectors 2 (fig. G1/2) of all the injectors.
- Activate the starter until the diesel fuel flows out free of air at high pressure connectors 2 (fig. G1/2).

IMPORTANT

Do not crank the engine continuously for more than 30 seconds at a time. Allow the starter motor to cool for two minutes between cranking attempts.

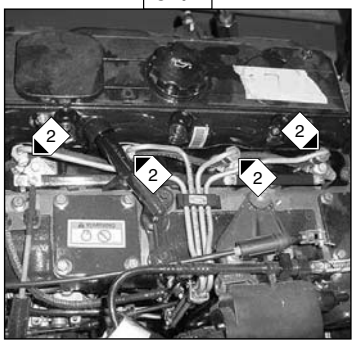
- Tighten the connection while the diesel fuel is flowing out (tightening torque 22 ft/lb).

- The I.C. engine is then ready to be started up.
- Run the I.C. engine at idle for 5 minutes immediately after bleeding the fuel feed circuit, to ensure that the injection pump has been bled thoroughly.

NOTE : If the I.C. engine functions correctly for a short time then stops or functions irregularly, check for possible leaks in the low pressure circuit. If in doubt, contact your dealer.

G1/1

G1/2



G2 - WHEEL CHANGING

CHANGE

WARNING

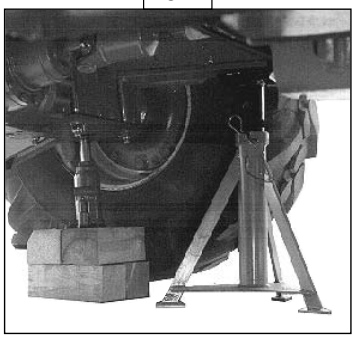
Use extreme caution when changing tires on the forklift - especially when parked near the public highway.
- Stop the lift truck on hard level ground.
- Safely park the lift truck, fully engaging the park brake.
- Turn the warning lights on (where applicable).

- Properly secure the forklift, place chocks on both sides of the tire opposite to the flat tire.
- Break-loose the wheel lug nuts on the flat tire.

NOTE: For this operation, use a 5 ton or higher capacity hydraulic jack and safety support (jack stand).

- Align the jack under the axle, as near as possible to the flat tire (Fig. G2).
- Lift the wheel off the ground and secure the axle with a safety support (Fig. G2).
- Remove the lug nuts and the flat tire.
- Install the new wheel onto the wheel hub.
- Start the lug nuts by hand, use lubricant if necessary.
- Remove the security stand and lower the lift truck using the jack.
- Tighten the lug nuts with a torque wrench (See A - DAILY OR EVERY 10 HOURS SERVICE for tightening torque).

G2



G3 - LIFT TRUCK TOWING

4-SPEED TRANSMISSION MODELS:

IMPORTANT

Do not tow the lift truck at more than 15 mph.

- Place the forward/reverse lever and gear shift lever in neutral.
- Release the parking brake.
- Turn on the warning lights (where applicable).
- If the engine is not running there will be no steering or braking assistance. Operate the steering and brake pedal slowly, avoiding sudden or abrupt maneuvers.

HYDROSTATIC TRANSMISSION MODELS:

IMPORTANT

LIFT TRUCKS EQUIPPED WITH HYDROSTATIC TRANSMISSIONS:
PUSHING OR TOWING WILL CAUSE DAMAGE TO THE TRANSMISSION,
DO NOT ATTEMPT TO PUSH OR TOW THE TRUCK TO START THE ENGINE.

G5 - LIFT TRUCK ON A TRAILER

TRANSPORT

CAUTION

Ensure that the safety instructions concerning the trailer are followed before loading the lift truck, and that the truck driver has been informed about the dimensions and the weight of the lift truck (See CHARACTERISTICS in SECTION 2 - DESCRIPTION). Ensure that the platform has dimensions and a load capacity sufficient for transporting the lift truck. Also verify the capacity of the contact surface on the trailer.

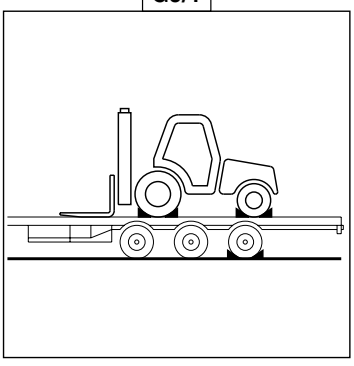
LOAD THE LIFT TRUCK

- Block the wheels of the trailer.
- Adjust loading ramps to a minimum angle for loading the lift truck.
- Load the lift truck parallel to the trailer.
- Park the lift truck (See DRIVING INSTRUCTIONS in Section 1 - OPERATING AND SAFETY INSTRUCTIONS).

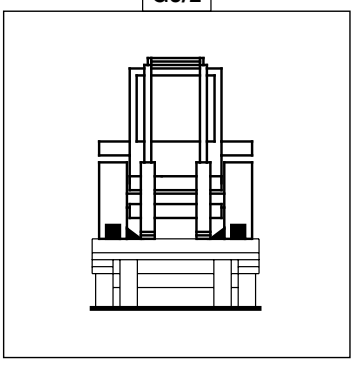
SECURE THE LIFT TRUCK

- Attach the chocks to the trailer at the front and at the back of each tire (Fig. G5/1).
- Also apply chocks to the trailer on the inside of each tire (Fig. G5/2).
- Secure the lift truck to the trailer with approved chain or straps. Mount the forklift at the front using the mast tie-down rings, and at the rear using the towing pin (Fig. G5/3).

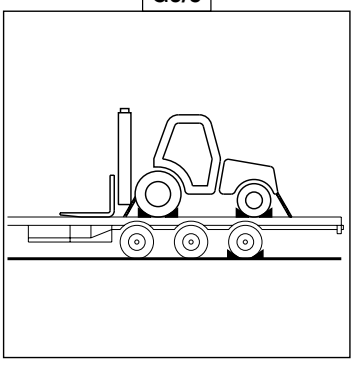
G5/1



G5/2



G5/3



G6 - CAB TILTING

LIFT

Park the lift truck, stop the engine and open the engine compartment.

RAISING THE CAB

- Remove the right and left side panels to gain access to the cab mounts.
- Loosen both fastening bolts, removing only the cab mount nut 1 (Fig. G6/1, 2 places).
- Using an approved overhead crane and sling (Fig. G6/2), slowly raise the cab.

IMPORTANT

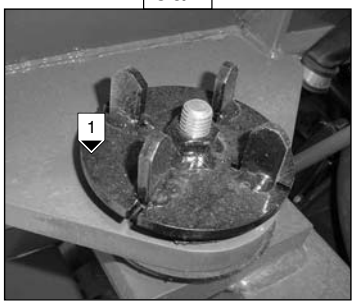
Remove any loose objects from the cab. Watch closely for obstructions or interference as the cab is raised. Do not raise the cab any higher than required to place the cab stand.

- The gear shift boot will turn inside-out (4-Speed Models only).
- Lift the cab until the cab stand can be placed within the cab stand rest on the back of the cab 1 (Fig. G6/3).
- Lower the cab until fully supported by the stand.

LOWERING THE CAB

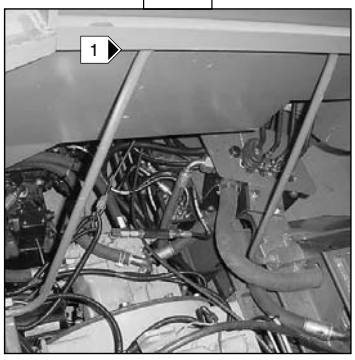
- Lift the cab slightly and return the cab stand to its clamp.
- Slowly lower the cab, watching for obstructions as the cab settles.
- Install and tighten the cab's mounting hardware.
- Reassemble the side panels.
- Reshape the gear lever boot (4-Speed Models only).
- Remove the lifting sling.

G6/1



G6/2

G6/3



G7 - EMERGENCY JUMP-STARTING

Read and follow the instructions carefully. If you have any questions, ask for assistance from an experienced mechanic or contact your nearest dealer.

Before attempting a jump-start, determine the condition of the forklift's battery: if it is damaged, has corroded connections or weak electrolyte, it will have to be serviced or replaced before proceeding.

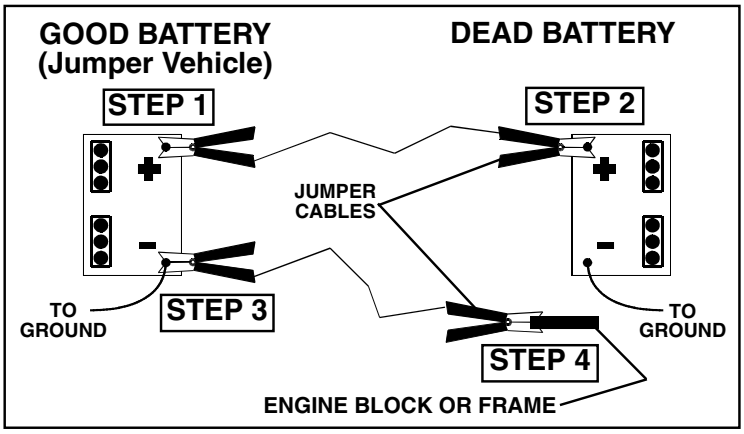
Jump-starting the forkllift requires a good, fully charged 12 volt battery or a vehicle with a 12 volt, negative ground electrical system. Park the jumper vehicle next to the disabled forklift, do not allow the vehicles to touch.

WARNING

Improper jump starting procedures can result in battery explosion.
Follow jump start instructions carefully.
Do not allow the jumper cable clamps to contact each other or any metal surfaces (except as instructed) while attaching or removing the cables.
Use only a 12 volt, negative ground system to jump-start your forklift.

Set the parking brake and turn off all electrical components on both vehicles.
Turn the jumper vehicle engine off.

Connect the jumper cables in the following sequence:
STEP 1: Clamp the positive (+) jumper cable to the good battery's positive (+) terminal.
STEP 2: Clamp the other end of the positive (+) cable to the dead battery's positive (+) terminal.
STEP 3: Clamp the negative (-) jumper cable to the good battery's negative (-) terminal.
STEP 4: Clamp the other end of the negative (-) cable to a solid metel point on the frame or engine (ground), at least 18 inches away from the battery. Keep the clamps away from the engine fan and belts.



Start the engine on the jumper vehicle and allow it to run at high idle for about 5 minutes.
Start the forklift. Make sure that the engines in both vehicles are at low idle before disconnecting the jumper cables.
Remove the cables in reverse order of installation:

Remove the negative (-) cable from the forklift frame or engine (ground).
Remove the negative (-) cable from the jumper vehicle.
Remove the positive (+) cable from the forklift.
Remove the positive (+) cable from the jumper vehicle.

If the forklift fails to start after several attempts, seek assistance from a qualified mechanic or contact your nearest dealer.